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INNOVATIVE APPROACHES IN INDUSTRIAL ENERGY EFFICIENCY

ORIGINAL

HEARING

BEFORE THE

SUBCOMMITTEE ON
ENERGY REGULATION AND CONSERVATION

OF THE

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

NINETY-NINTH CONGRESS

FIRST SESSION

ON

INNOVATIVE APPROACHES IN INDUSTRIAL ENERGY EFFICIENCY

OCTOBER 18, 1985

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INNOVATIVE APPROACHES IN INDUSTRIAL ENERGY EFFICIENCY

FRIDAY, OCTOBER 18, 1985

U.S. Senate,
Committee on Energy and Natural Resources,
Subcommittee on Energy Regulation and Conservation,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:03 a.m., in room SD-366, Dirksen Senate Office Building, Hon. Daniel J. Evans presiding.

Present: Senators Evans and Hecht.

Also present: Allen Stayman, professional staff member; and James T. Bruce, counsel for the minority.

OPENING STATEMENT OF HON. DANIEL J. EVANS, A U.S. SENATOR FROM THE STATE OF WASHINGTON

Senator Evans. This hearing by the Subcommittee on Energy Regulation and Conservation will come to order.

I'm delighted to be able to chair this hearing on innovative approaches in industrial energy efficiency. I have had a keen interest in this subject for many years, both as an engineer and the first chairman of the Pacific Northwest Power Planning Council.

Let me first apologize to our witnesses for the delay in the hearing from its originally scheduled date. The committee at that time in September was under tight time constraints to report out a budget reconciliation bill which was then our top priority. I fear that at some time during our hearing today I may be called away temporarily for votes on the floor. We're back on budget reconciliation, this time on the floor of the Senate, and we're already in session so we may be interrupted once or twice.

Industrial energy efficiency may sound like a rather arcane subject, but I believe that it may be one of the keys to our own energy future. American industry has made great strides in improving energy efficiency since the rapid price increases in energy triggered by the first oil crisis in 1973. In the past 10 years, industry has become more energy efficient by roughly 25 percent. In the last 4 years, efficiency has risen about 13 percent.

With those gains, however, I think we have merely scratched the surface. We must also continually compare our efforts to those made in other advanced industrial companies such as Japan and those of Europe. We live and survive in an increasingly competitive world. Energy efficiency is inextricably related to the overall question of competitiveness. This is especially true for the energy-intensive industries such as aluminum smelting, basic chemicals, petroleum refining, paper and pulp industries and others. I hope we will hear from our witnesses today about the linkage between energy efficiency and international competitiveness.

We will also hear today about the leading and innovative role that the private sector is taking in energy efficiency efforts. Energy service companies have been multiplying rapidly throughout the country. The role of government, as our witness from the Washington State Energy Office will state, is to simplify outmoded regulations in order to accommodate these new ideas.

I'm delighted that this committee included a share-the-savings provision for Federal buildings in our reconciliation bill. I also had the opportunity to address the National Association of Energy Services Companies last week and I'm delighted that we will hear from them at the hearing today.

The truly significant increases in efficiency in the industrial sector, however, will come about through more dramatic improvements in the processing and manufacturing stages. Such improvements require rather significant changes in processing equipment, as well as substantial investments of capital. Management must be convinced that it is economically justified to make the investment and then be able to procure the necessary capital to do so. One recent example is the Kaiser Aluminum proposal of reinsulating their pots at smelters in the Pacific Northwest to save approximately 170 megawatts of electric power. I am confident that other industries can come up with similar proposals that make sense economically.

Today's hearing is one of oversight. We are not considering any specific legislation at this time, but I do hope that we can forge new ground in several areas. The first is the role of government, Federal and local, in increasing energy efficiency in the industrial sector. Before we make policy decisions, we need a good data base. The data base that DOE has now may not be sufficient and, if so, we must take steps to ensure that our surveys of the manufacturing sector are thorough and intensive.

The second is to determine the potential of the magnitude of energy savings in the industrial sector for the future. Once we have an idea of how much potential is there, utilities can better plan their resource mix for the next 10 or 20 years.

The third is to examine the range of technologies that are available to industry today that may bring about dramatic improvements in energy efficiency. As an engineer and an optimist about our ability to solve our energy future, I am especially interested in this area.

With that, I am pleased to welcome panel No. 1 to our hearing: The Honorable Alan Streb, Deputy Assistant Secretary for Conservation from the Department of Energy; and the Honorable Frank Stewart, Director of State and Local Assistance Programs for the Department of Energy.

Senator Hecht from Nevada, a member of our committee is here. Senator Hecht, do you have any initial statement?

Senator HECHT. No, thank you. You said it very well. I just came to hear the testimony.

Senator EVANS. Thank you.

With that, Mr. Streb, proceed.

STATEMENT OF ALAN J. STREB, DEPUTY ASSISTANT SECRETARY FOR CONSERVATION, DEPARTMENT OF ENERGY

Mr. STREB. Thank you, Senator. We have prepared detail testimony, and that's been submitted for the record.

Senator EVANS. In all cases, all witnesses' statements will be submitted for the record and you may proceed in whatever way you would like.

Mr. STREB. I'd like to begin summarizing the content of that testimony. My colleague will conclude, covering the areas of activity that his program concerns.

To distinguish between the two, to begin with, the Conservation Program, that portion of the Conservation Program which I manage is concerned mainly with technology development, whereas Mr. Stewart's program is concerned predominantly with the grants that are made to States and local governments.

We do appreciate the opportunity to appear before you this morning to discuss the Department's commitments to conservation and innovative mechanisms to promote conservation in the private sector.

Conservation has already evolved into a very major energy resource, or the equivalent thereof. Energy consumption, as you indicated in your remarks, per unit of GNP declined over 20 percent across the board since 1973 and 13 percent just in the last 4 years.

The total energy consumption in 1984 was actually less than it was in 1973, which we think is a remarkable accomplishment. Those savings are the equivalent of five Alaskan pipelines which, of course, will continue to flow and never run dry.

As you indicated also in your opening remarks, substantial additional improvements are possible, but to a large extent will rely on advances in technology. The Department of Energy has encouraged and continues to encourage conservation within the context of a free and competitive market, mainly through programs in research and development which are cost-shared with industry that deal with opportunities in the longer term which have a high risk and potentially high payoff.

The program also offers substantial information and technology transfer activities.

Within the industrial sector of our overall program, the Industrial Conservation Program includes over 200 research and development projects which are currently being supported. Twenty-three projects which have been completed in the past have already resulted in products which are resulting in substantial energy savings, something in excess of 33 in Btu's annually, and those people who are benefiting from those savings are saving $150 million per year in energy costs.

We continue an active program. Some of the more interesting and substantial parts of that currently are a major program in thin strip steel casting which will offer, if successful, when successful, substantial benefits to that industry as well as other primary metal industries.

We have also recently, during the last year, been involved in a program cooperatively with the State of Minnesota, the American Iron and Steel Institute and some of the members of the steel industry in a project to operate an advanced direct reduction process for reducing iron ore directly to iron, basically a process which consolidates functions of the coke battery and the blast furnace.

A companion program to the Office of Industrial Programs is our Energy Utilization Research Program which deals with more fundamental issues, and it is largely focused at the current time on advances in ceramics, ceramic manufacturing, ceramic joining, all of which have implications in energy conservation because they basically enable higher temperature operation in our systems.

Another material development that has emerged from that program which is of great interest to the industry at the moment is the development of long-range ordered alloys, basically intermetallic materials which have superior strength to super-alloy materials as well as oxidation resistance.

Beyond the program which deals with industry, we have an active program in transportation which is working with industry on the development of advanced heat engines, for example, for automotive and truck applications and technologies which will make electric vehicles economically possible.

We have an aggressive program in the buildings area which deals with buildings technology, such as lighting, heating and cooling, overall architecture which can result in more efficient buildings.

We have supported, in close cooperation with HUD, Housing and Urban Development, the Department of Energy has made grants to municipalities in the area of district heating and cooling, basically seed money to enable these municipalities to do a preliminary first evaluation of the feasibility, the technical and economic feasibility of such systems.

Forty-three grants have been made to date over a period of about 6 years. A number of these have resulted in the community continuing their work and commitments of as many as 10, I believe, municipalities have already committed to go forward with the actual installation of such systems.

Within our program as well, we do operate—we manage the Federal Energy Management Program that focuses on the buildings that are in service in governmental and in Federal agencies. This has resulted in improvement of about 12 percent energy use per gross square foot over the last 10 years.

The program includes a number of other activities. We have just recently completed the first of four mobile laboratories, a photograph of which I have here, and it's available to you if you'd care to look at it. These laboratories—and there will be four of them—will be stationed at major Federal installations and will be used to make detailed assessments of the energy use at those installations.

The first vehicle that you see will be placed first at Pensacola. It will spend something in excess of 6 months there, doing a detailed assessment of all the buildings on that particular naval base.

Another program is the Energy Related Inventions Program which we think has been a tremendous success. We evaluate ideas that are submitted to the Department by inventors, generally individuals. There have been 20,000 such inventions in the life of that particular program that have been evaluated by the Department of Energy. Where the idea is considered to have sufficient merit, a grant is made to the inventor to pursue the development of that idea.

Forty-two million dollars of Federal support to date have gone into that over the life of the program. We have supported something in excess of 200 inventors. The results of that are numerous potential new products, several of which have already reached the market and are saving something in excess of $15 million in energy costs annually.

As a companion piece to the research program and to the Federal Energy Management Program and to the inventions program—and it really is an integral part of all of those programs—we conduct a program of technology transfer which is designed to promote the adoption of energy conservation technologies in the marketplace.

This works in a variety of ways. We believe that by involving the industry, the manufacturers of equipment in the early research, that by itself is a powerful tool in terms of promoting the use of the products which emerge from the research. But, in addition to that, we conduct a variety of workshops and seminars and various other assistance programs to make industry aware of the opportunities that are before them to improve their overall efficiency.

Today, in fact, over in Crystal City, we are concluding a 2-day workshop on the aluminum industry which is presenting to technical executives of all the U.S. aluminum industry, advances which have been made as a result of both the Federal program and other developments for their ultimate use in their process upgrading.

We have recently completed a similar workshop with the pulp and paper industry. We have completed a similar workshop in the area of heat recuperators.

A part also, a very important part of the technology transfer activities, is our EADC Program—that's Energy Analysis and Diagnostic Centers—which is an audit program that is conducted by universities that are selected to provide geographic distribution around the country. The EADC, the Center provides audits basically to small and medium-sized manufacturers who request such audits. It represents about a 2-day walk-through and examination of the facility and a report which recommends improvements which can be made.

To date, we have conducted through that program 1,283 such audits covering industries in 32 different States and the result of that has been savings that are something in excess of 9 trillion BTU's.

That basically concludes a very quick overview of my portion of the Conservation Program. I would like now to turn to my colleague to give you a summary of the Grants Program.

Senator EVANS. Mr. Stewart.

STATEMENT OF FRANK M. STEWART, DIRECTOR, OFFICE OF STATE AND LOCAL ASSISTANCE PROGRAMS, DEPARTMENT OF ENERGY

Mr. **Stewart**. Thank you. Good morning, Senator.

As my colleague had mentioned, my area of responsibility in the Department of Energy includes the Schools and Hospitals Grant Program, the Low-Income Weatherization Assistance Program, and the programs to support the State energy offices.

I, too, welcome the opportunity to be here this morning to discuss some of these innovative approaches to support of greater energy efficiency. The increased participation of State and local government and the private sector is, I believe, critical to the achievement of significant ongoing improvements in energy efficiency on a national scale.

The activities of our Office of State and Local Assistance Programs are directed at supporting State and local governments in effectively assisting businesses, nonprofit institutions, individual consumers, and themselves become more efficient in their use of energy.

We have given particular attention to the application of innovative technologies and to private financing and to the sharing of that information with State and local governments and with the private sector.

Over the past 4 years, we have become better in terms of our understanding of some of the key institutional issues which prevent more aggressive action on the part of institutions toward increasing their energy efficiency. Principal among these issue areas are concerns with the financing of building retrofits and with the availability of energy management expertise.

Innovative financing methods, such as guaranteed savings and shared savings, we believe, offer in a number of areas a viable way of addressing both the concerns of financing and the concerns of the availability of expertise.

Such methods are being tested by our office in a variety of demonstration projects for various nonprofit client sectors. These demonstration projects will be reviewed, analyzed, described, and the results will be disseminated through publications and through training sections, to lay the foundation for more widespread application.

Developments in technology and practical energy management experience will also be transmitted along with the financial information.

To date, and to the best of our knowledge, nearly 30 State energy offices have conducted programs to acquaint building owners and building managers with the potential that these approaches might have for their conservation retrofit projects.

A dozen or more State energy offices have led the effort to modify State law and/or State policies to enable their institutions to participate in such third party financing contracts. Among the growing number of successses at encouraging the use of third party financing contracts are the experiences of the States of Michigan and Washington, which you will hear later this morning, as well as the experiences of the States of Rhode Island, New Jersey, New

York, Georgia, Colorado, Pennsylvania, Iowa, Montana, Utah, Delaware, Florida, Minnesota and several others.

Recently, I had the occasion to speak before a workshop sponsored by the Association of School Business Officers. At that time, I mentioned that the Schools and Hospitals Program has awarded some $600 million over the last several years and very effectively reached some 10 percent of the school and hospital building population.

I further mentioned to them that if Congress continues to be generous in allocating $50 million a year to the Schools and Hospitals Program, then those students who last month entered school for the first time will be entering college for the first time before we reach the next 10 percent.

That is to say that there probably will not be enough public funds and probably should not be enough public funds directed at energy efficiency projects in schools and hospitals to meet the need in this century. That is schools and hospitals—let alone the needs of local government across the country, of State governments across the country, of Federal Government across the country, of nonprofit organizations like those associated with the United Way.

The effective utilization of private financing for building retrofits is, I believe, essential to grasping this opportunity for a more energy efficient society.

Again, let me thank you for the opportunity to address you this morning. My colleague and I stand ready to answer what questions you may have regarding our responsibilities with the Department of Energy.

[The prepared statement of Messrs. Streb and Stewart follows:]

STATEMENT OF

ALAN J. STREB

DEPUTY ASSISTANT SECRETARY FOR CONSERVATION

FRANK M. STEWART, DIRECTOR

OFFICE OF STATE AND LOCAL ASSISTANCE PROGRAMS

U. S. DEPARTMENT OF ENERGY

BEFORE THE

SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION

COMMITTEE ON ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

OCTOBER 18, 1985

Mr. Chairman and members of the Subcommittee, we appreciate this opportunity to appear before you today to discuss the Department of Energy's (DOE's) commitment to energy conservation, and the innovative mechanisms being employed to promote conservation by private industry and state governments.

In little more than a decade, conservation has evolved into a major factor vitally affecting national energy supply and demand patterns. In the past four years, energy efficiency--measured by energy consumed per unit of economic output--improved by 13 percent, the greatest improvement in energy efficiency in any four year period in recent history. Much more improvement is possible, using both new and existing products and, increasingly, products and technologies which are currently under development. New energy conserving technologies, many of which are a result of federally supported research, are being applied by a broad industrial base and a knowledgeable financial and professional infrastructure. Many of the accomplishments of the past decade are a reflection of the creativity of the Nation's scientists and engineers, the inventiveness and productivity of the private sector, and the dynamic and sound economic judgments of millions of energy producers and consumers in a free and competitive market.

While a free and competitive market provides the incentives for the adoption of energy consuming technologies, the Department encourages conservation in a number of complementary ways. DOE's research and development and information and technology transfer programs assist energy pioneers and entrepreneurs who invent, develop, and market conservation technologies. DOE also supports a wide variety of Federal, state, and local programs and initiatives.

Collectively, these mechanisms help private industry, institutions, and consumers meet the challenges of capturing the economic and commercial potential of conservation as an energy resource. Consumer choice, the ongoing Federal commitment to conservation research, and innovative programs that stimulate adoption of energy conserving technologies together provide further impetus to energy conservation within the dynamic and competitive marketplace of the future.

We would like to highlight a number of the Department's efforts and recent accomplishments in several areas, beginning with the industrial sector.

INDUSTRY

At the center of the Department's commitment to conservation is our support for energy research and development which provides important parts of the technology base of fundamental scientific and engineering knowledge from which commercial technology is derived. Much of this activity is focused on the Nation's industrial sector. Our industrial conservation program addresses selected conservation technologies which private industry is unlikely to develop independently because of their high risk, but which have the potential to result in significant improvements in the Nation's industrial energy efficiency. To date, over 200 research and development projects have been supported, typically on a cost-shared or cooperative basis with private industry. Twenty-three completed projects brought to the marketplace by industry are currently saving an estimated 32 trillion Btu's of energy per year, valued at more than $150 million per year in savings, and will save even greater amounts as market penetration continues.

The Department of Energy's industrial conservation program is currently undertaking a number of research efforts aimed at the Nation's most energy-intensive industries. For example, the Department is supporting US Steel and Bethlehem Steel in the development of technology to produce thin steel sheet directly from molten metal. Federal support is also being provided to Westinghouse and Armco Steel for the development of another advanced steel strip casting approach using a spinning wheel with electromagnetic confinement of the molten metal. And recently, the Department participated in tests, with industry, of a process which produces iron using a direct-reduction method, bypassing two energy-intensive steps currently used--the coke oven and blast furnace. As another example, we have supported the development of advanced electrolytic processes which, if successful, could reduce the electric power required for aluminum smelting by as much as 20 percent. These new technologies hold great promise to reduce the energy required in the manufacture of steel and aluminum, thus making U.S. industries more competitive in the worldwide marketplace.

In addition to direct support for private sector research, the Department of Energy operates a number of user-oriented laboratory facilities where new theories, materials, and processes can be developed and tested. The Department is currently constructing a new facility which will be dedicated to the development and testing of high temperature materials, such as ceramics and composites, for applications in transportation engines of all types as well as high temperature industrial processes. Other laboratory activities include a daylight simulator used to assess the performance of innovative building designs, and a mobile window test facility that window manufacturers can use at their industrial sites to test the energy performance of new glazing configurations.

Private industry is also undertaking a considerable number of initiatives, independent of Federal support, to reduce energy use. New methods and facilities are being applied to manufacturing and obsolete equipment is being replaced with newer, more energy-efficient designs with the net result being that U.S. industrial energy use per unit of output has dropped by over 29 percent in the period between 1973 and 1984.

COMMERCIAL BUILDINGS

Significant advances have been made in recent years to reduce energy consumption in the Nation's commercial buildings sector, with average energy consumption per square foot of building space having been reduced by over 11 percent in the past 10 years. DOE has supported and encouraged energy conservation in commercial buildings through a number of research programs relating to building materials; energy efficient architecture; building heating, cooling, and lighting equipment; and community-wide energy delivery systems. In addition, the Department has promoted the development of voluntary standards for the energy-efficient design of commercial buildings and has initiated several projects to demonstrate the effectiveness of these standards to commercial building owners and designers.

DOE has also worked directly with communities to improve energy efficiency of commercial structures. Under DOE grant programs, a number of communities throughout the Nation have or are currently performing feasibility assessments to evaluate district heating and cooling concepts. Several of these feasibility assessments have resulted in follow-on design and construction of energy-conserving district heating systems serving a variety of commercial, institutional, and government-owned buildings, representing total investments of well over $100 million.

ENERGY RELATED INVENTIONS

A Federally sponsored effort which promotes innovation by the private sector in all areas of conservation is the Energy Related Inventions Program. Begun in 1975, this program focuses on the inventive capability of individuals and small companies not having the fiscal resources to move their ideas toward the marketplace.

The Department of Energy program supports initial research and development efforts on promising inventions to help verify their conservation potential. It also sponsors workshops which put inventors in direct contact with patent, marketing, and venture capital experts as well as potential cost-sharing partners in industry. To date, more than 20,000 inventions have been evaluated for Federal support, and more than 200 awards have been made, providing approximately $16 million in Federal support. It is estimated that inventions fully developed under this program currently are saving their users over $20 million per year in energy costs.

STATE AND LOCAL PROGRAMS

The increasing participation of State and local governments and the private sector is critical to the achievement of significant ongoing improvements in energy efficiency on a national scale. The activities of our Office of State and Local Assistance Programs are concentrated on assisting State and local governments to become self-sufficient in designing and implementing near term programs that result in more efficient use of energy by industry, transportation, commercial and public buildings, and residences. We have given particular attention to the application of innovative technologies and private financing and sharing of that information with State and local governments and the private sector.

Technical Assistance

DOE provides funding and technical assistance to support state information-sharing and technology transfer activities. This assistance has resulted in a broad range of state programs that vary in size and scope, and apply techniques that are tailored to meet specific state and local needs.

The State Energy Offices, with DOE support, actively share program guidance and technical information among themselves and with other interested parties. Their programs are described in our annual *Directory of State Energy Programs* and monthly *Conservation Update*; the

Update also describes activities of non-government organizations. In addition they participate in regional and national meetings to promote the exchange of technical information and assistance.

Innovative Financing

Over the past three years we have come to understand some of the key institutional inhibitors which often prevent more aggressive moves toward increased energy efficiency. Principal among them are sets of inhibitors related to financing building retrofits and energy management expertise.

Innovative financing methods, such as third-party financing, are being tested by our office in a variety of demonstration projects. The techniques will be reviewed, analyzed, described, and results disseminated through publications and workshops to lay a foundation for widespread application. Transmitted with the financing information will be developments in technology and practical energy management experience.

To date nearly 30 State Energy Offices have conducted programs to acquaint building owners with the potential of third-party financing for conservation retrofit projects. A dozen or more States have led the efforts to modify State laws to enable their institutions to participate in third-party financing contracts. Among the growing number of successes in overcoming financing barriers are the experiences of programs in Delaware, Michigan, and Washington.

- Delaware. The Georgetown Technical and Community College needed to have its heating system retrofitted, but could not cover the cost with available funds. The State Energy Office staff worked with the College to put together a third-party financing arrangement whereby utilities provided the up-front funds which were to be repaid from energy saved. The heating system retrofit was financed and the work accomplished.

- Michigan. The State's Energy Efficiency Financing program, with DOE support, has sponsored or assisted demonstration projects using performance based (shared savings) contracting for several building sectors--municipalities, schools, hospitals, State facilities, small businesses, and multi-family housing. In each demonstration, significant bottlenecks impeding adoption of energy efficiency improvements were overcome.

  Michigan also has initiated an innovative financing information-sharing network, with a number of other States, to help expand the use of such financing approaches.

- Washington. The State Energy Office explored the potential for private investment through energy service companies in institutional energy projects. Subsequently the SEO set up an Innovative Financing Demonstration Project to develop contracts between local governments and energy service companies. A broker service delivery model was selected which would advise local governments and help them solicit and evaluate contractor offers.

The SEO also prepared legislation to simplify the contracting process and make possible third-party financing contracts by local governments. Washington's SEO is now recognized as an information clearinghouse for both building owners and investors interested in energy service contracting in the Northwest.

Through programs which provide state-matched grants to identify conservation needs and implement energy retrofit measures at eligible schools and hospitals, DOE also has assisted a variety of ongoing alternative financing initiatives conducted by State, community, and private sector organizations. Their products will include:

o a computer model of energy data and analyses for local government administrators;

o alternative financing information distributed to public and non-profit building administrators via a telephone clearinghouse;

o three monographs for hospitals on non-Federally assisted conservation projects;

o demonstration of the feasibility of using comprehensive energy service companies to finance, install, and maintain conservation measures in municipal and non-profit institutional buildings;

o analysis for hospitals of financial and contractual implications of shared savings; and

- documentation of innovative financing accomplishments and setbacks in three State: Minnesota--alternative financing for local government and public care institutions; New York--financing demonstration for energy improvement in private K-12 schools; and Florida--demonstration of financing through consortia.

FEDERAL FACILITIES

The Federal government itself is a target of a comprehensive energy conservation program. Led by DOE's Federal Energy Management Program (FEMP), we have made significant progress in reducing energy consumption in nearly 500,000 buildings by almost 12 percent over the past 10 years. Most of these savings have been achieved to date through improvements in building operations and maintenance, requiring minimal capital investment. The remaining potential for energy conservation must be obtained through actual building retrofits, which require a substantial capital investment. Combined with the capital investment requirement is the need for skilled energy engineering expertise to assure that the retrofit investments are cost-effective to install and operate and are suited to the building and its mission. This unique combination of engineering skills and financial capability can be found in a growing private sector industry, comprised of firms known generally as energy services companies.

FEMP has undertaken an exploration of the barriers to utilizing private sector resources such as energy services companies to accomplish the retrofit of Federally owned and operated buildings. FEMP's research has identified a listing of barriers to private investment in Federal facilities under shared savings concepts, and a specific set of proposals for overcoming them through legislative, administrative, and procedural reform.

For example, the Administration is now working closely with staff of the Senate Energy and Natural Resources Committee and the House Committee on Energy and Commerce on drafting legislation. If enacted into law, the proposal would provide Federal agencies with multiyear authority to enter into contracts for energy retrofit projects. This and other reforms being explored by FEMP will help to achieve the overall goal of maximizing the energy efficiency of Federal buildings while minimizing the expenditure of Federal funds.

TECHNOLOGY TRANSFER AND TECHNICAL ASSISTANCE

As a part of our research and development efforts, the Department supports an active program of technology transfer and technical assistance aimed at industry and manufacturers of products for all sectors of the economy. The program of technology transfer is designed to promote adoption of energy-conserving technologies by the marketplace. Technology transfer includes the collaboration established between the Federal government and the private sector in the performance of research and development; information exchange and dissemination through workshops, seminars, conferences, publications; various technical assistance services; and grant programs carried out in cooperation with state and local governments. As an example of typical technology transfer, DOE's Office of Industrial Programs recently sponsored a conference on the recovery of chemicals from paper mill waste products.

Researchers from all of the major paper manufacturing companies, along with university and Federal laboratory research scientists, were brought together to discuss current research activities, results of recent research programs and areas where additional R&D emphasis could be placed.

The Department is also involved in numerous efforts which focus attention on the economic benefits that are associated with new energy-conserving technologies. For example, the Department sponsors the operation of Energy Analysis and Diagnostic Centers at 12 universities which provide energy auditing services to small- and medium-sized manufacturers. Through these centers, over 900 audits have been performed. Energy conservation measures undertaken as a result of these audits are now generating estimated energy savings of over seven trillion Btu's per year.

In conclusion, the Department has a broad and highly successful set of programs and activities designed to complement private sector activities and encourage institutional, state, and local efforts.

I would be pleased to answer any questions you may have.

Senator EVANS. Thank you very much, both of you.

Let me go back to the written testimony. You said here, "To date, over 200 research and development projects have been supported typically on the cost-shared or cooperative basis with private industry; 23 completed projects brought to the marketplace by industry are currently saving an estimated 32 trillion Btu's."

How many of those projects really relate to industrial processes versus—if we could divide energy savings in the industrial field into two broad arenas, one sort of the cleanup or maintenance, the pump efficiencies and the insulation and all the rest of it that's fairly general, and then the other being changes in industrial processes or more directly aimed at the energy savings that can be accomplished in that particular process for industry, how would you categorize the projects that have already been carried out? Which way are you focusing?

Mr. STREB. Well, the program has been a balanced program. It's really dealt with both what I refer to as the externalities of the process, basically ways of cleaning up the losses on the input or the output side, and the internal or the basic process itself.

The specific breakout of the 32 trillion I can't give you offhand. I can provide it for the record. But it really does include both. It is all savings in industrial process, but part of that are savings resulting from such things as the use of a high temperature ceramic recuperator which has been developed as part of our program.

Part of it is also related to basic processes. One that comes to mind is a textile process which was developed under the sponsorship of the OIP Program, a process for dying of textiles which reduces the amount of aqueous vehicle associated with the dye application, and therefore reduces the amount of heat applied.

My guess is that it's something on the order of 50/50 between the external savings and the basic process changes.

[The information follows:]

CLASSIFICATION OF SELECTED INDUSTRIAL PROGRAM COMPLETIONS

There are 23 completed projects in the Industrial Program area which have been categorized as follows: 12 are generic technologies and 11 are process changes.

Senator EVANS. When you get to the basic process—I guess this question really applies to both, but particularly on the process side—in your work with industry and your people's work with industry, do you have any sense of how short the payoff has to be before industry looks upon this as an appropriate thing to do with their own funds, purely with their own funds?

Mr. STREB. Well, I think in general, of course, industry, I think, as others are looking for ultimate payoffs on the order of 3 years or less. The problem has to do more with, as I see it, the perception of risk and the unknown dimension as to when such technology would be available that results in a bit of an impediment to industry pursuing research on real advances in technology. They simply don't know when the technology would become available, and for that reason and because of uncertainties in the development process itself, exhibit a certain reluctance to making the commitment that would ultimately result in the development.

Senator Evans. Well, I'm thinking not so much about those areas where we're talking about that is new processes or new inventions, but those that are fairly well known and understood. If the payoff is 5 or 6 years, do you find that industry, even knowing that they can get that kind of return in 5 or 6 years, says that's too long; we've got other uses for our capital?

Mr. Streb. I believe that that would be the case, Senator.

Senator Evans. And would you again say that the dividing point is around that 3 year, from your information, that if payoff is less than 3 years, that it becomes interesting to do, just with internal capital?

Mr. Streb. That would be my estimate; yes, sir.

Mr. Stewart. If I could add one point to that, Senator.

Senator Evans. Yes, please.

Mr. Stewart. I did have a chance several months ago to speak with some industrial leaders in the Southeast. Of course, their concern is an after tax bottom line, so that whatever savings we might look at in terms of a gross return on investment then has to be factored by, of course, 60 percent. So that anything that would have a gross payback of even 3 years really becomes very, very marginal for them in terms of a decision.

Senator Evans. Becomes marginal, or at least they think it becomes marginal.

To what degree on your—you mentioned the work on commercial buildings, and of course the industrial processes that are difficult because of their variety. So are commercial buildings, perhaps not quite as varied as industrial processes, but still an enormous variance both in size, style, geography.

To what degree have you worked or have you been able to gain information and background from foreign nations on energy-related work? I guess it would apply both to industrial and to commercial buildings, but looking at commercial buildings I know there's been a good deal of major effort, especially in some of the Scandinavian and other northern countries.

How actively do you have technology interchange transfer with what's going on overseas?

Mr. Streb. I believe that we have a very good exchange through the International Energy Agency for one. We have collaborative research arrangements with various countries in the Western European area, as well as Japan. And there is a great deal of exchange of information that occurs via the IEA. In addition to that, there are a number of bilateral agreements that have provided good dialog between the experts in the United States and other countries.

One that I would specifically mention is a fairly recent bilateral agreement with the United Kingdom that covers a variety of subjects, one of which is passive solar of building, and there we have the experts on each side of the Atlantic dealing with each other actively, exchanging the results of the research work and the actual application work that's being done in the two countries.

Senator Evans. What about the—you mentioned that the Department had promoted the development of voluntary standards for energy efficient design of commercial buildings, several projects to demonstrate the effectiveness of standards.

How actively are you involved in any interchange with organizations of building code officials or others in order to attempt to transfer these energy efficiency standards into regular building codes and requirements?

Mr. STREB. Well, the specific mechanism for dealing with commercial buildings, for example, has been a very close working relationship between the staff of our building program in conservation and the standards committees of ASHRAE, the American Society of Heating, Refrigerating and Air-Conditioning Engineers.

The result of that has been a new ASHRAE standard which will become the voluntary standard that we proposed which will result, if adopted, will result in an improvement of about 16 percent of energy use per gross square foot over the old ASHRAE standard.

Now, the old ASHRAE standard was adopted on a voluntary basis by 40 States. I believe that number is correct. And therefore, it's use is really quite extensive as the basic building standard for those States. We would hope and expect that the new standard will be adopted at last by the same 40 States.

Senator EVANS. Mr. Stewart, on Federal buildings, you mention that you've made significant progress in reducing energy consumption, half a million buildings by 12 percent over the past 10 years. Would you say that, as far as you know, we have accomplished essentially all of the energy conservation elements that can be accomplished with a 1-year or less payoff?

Mr. STREB. Senator, may I take that? I believe that we have accomplished many of the easy things. We do believe that there are many more easy things—that is, 1-year payoff or whatever—that remain to be implemented.

We, however, at the same time recognize that the great future opportunity lies in much more extensive renovations perhaps or the adoption of new equipment in those buildings that will require much more capital, much greater investment than has been required for the previous 12 percent savings.

And for that reason, of course, we are very interested in the concept of shared savings as it applies to Federal buildings. Working with the Department of Defense, we have initiated a program of demonstration of shared savings in five—I believe it is—Department of Defense facilities.

One major impediment to the application of this concept which would avoid the need for the expenditure of Federal funds and therefore be very desirable from our perspective has been the inability of the agencies to commit to multiyear contracts for the time period that is required to satisfy the needs of organizations that offer shared savings programs. And for that reason, both the House and the Senate, as you are aware and mentioned in your opening remarks, have introduced legislation into the reconciliation bill which will remove that barrier and hopefully enable us to move forward rapidly.

Senator EVANS. Are you satisfied with the nature of those proposals? Do they, in your view, adequately offer the opportunity that's necessary?

Mr. STREB. We are delighted with the language.

Senator EVANS. Let me pursue, however—I understand that we're moving to the bigger and broader and the multiyear savings.

It just seems to me, however, that there ought not to be one Federal building and certainly not one private building or anybody who works on a yearly budget.

If the payoff is 1 year or less, you don't need any money. That comes right out of—you know, if you've got a current budget and installation of any kind of an energy saving device or method result in a less than 1-year payoff, I would suggest that they better hop to it. There's no need for any investment; that's already in your current budget. Just by definition, a 1-year payoff means that money is there.

Have we mined that absolutely thoroughly, or do we need to give a little extra encouragement somewhere along the line to make sure that Federal installations fully meet that kind of proposal?

Mr. **Streb**. Well, I certainly agree with your point. The extent to which this has been mined, that is, whether we have uncovered every opportunity of such a nature or not, I really can't address. We are encouraging through the Committee of Energy Coordinators of the various agencies, and have been, of course, the implementation of these simple things, relatively simple building modifications.

There is a quarterly publication which is issued by the FEMP Office which identifies such opportunities, and I believe that we have—that is, the Department of Energy—has taken every action that it has within its power to point out where these opportunities are and to encourage the agencies to adopt them.

Senator **Evans**. Well, that's what I was trying to get at. In your view, is there still a lot out there, and if DOE can't encourage it, perhaps we can do something to make sure that that happens? Maybe it's not worth pursuing, I don't know. Maybe there are other areas where there's a lot more——

Mr. **Streb**. I am not aware that we have actually made an estimate of what may remain in the form of, let's say, simple improvements. But if we have made such an estimate, I will submit it for the record.

[The information follows:]

ADDITIONAL ENERGY SAVINGS POTENTIAL IN FEDERAL BUILDINGS FROM OPERATIONS AND MAINTENANCE CHANGES

DOE has not developed specific estimates on what further energy savings might be achieved from operations and maintenance changes.

Senator **Evans**. How about the same thing, Mr. Stewart, on schools and hospitals? It seems to me that no school in the country, no hospital in the country ought to wait a minute to get at something like that where there are those kinds of payoffs.

Have they been pretty good at doing that in your view?

Mr. **Stewart**. I think you're absolutely right, Senator. One of the criteria that we use for eligibility for the grants program was that the institution had to certify to us that they, one, had an energy audit completed and had implemented any activity identified by the audit that had a payback of 1 year or less before they were even eligible.

So between that data that we have, as well as what I've learned from State associations and from some of the national associations, I think the schools and the hospitals have been quite aggressive in addressing their at least low-cost energy opportunities.

Senator EVANS. You mentioned also the State energy offices. I think you said 30 of them have developed some broad bent—12 of them are already into third party contracting and financing ideas.

Does anyone act as a clearinghouse or an exchange of information as to what's going on in those State energy offices? Do they have an organization that does that, or do you act in that capacity?

Mr. STEWART. We have instituted within the last couple of years, two vehicles for being of assistance in that regard. We, along with the Federal Energy Management Program, which is under Mr. Streb's responsibility, have put together a clearinghouse of information regarding third party financing. We've made that information, access to that available to all Federal agencies, all State governments, and all local governments. It's designed for the public sector.

Additionally we have, through the auspices of the State of Kentucky, established a monthly newsletter among the State energy offices to keep them apprised of the progress that each other is making, particularly in this area.

So they have the opportunity to share information by telephone. They share copies of RFP's that have been developed. They share copies of reports of various products they've employed, and it's been a major element of most of the State, national, and regional conferences that have been held with these offices over the last couple of years.

There has been a great deal of sharing in that regard.

Senator EVANS. Can either of you comment, just pick from your memory the best single idea that you've heard come forth in this whole area of energy conservation, especially in your work with State energy offices, with the schools, hospitals, or the others?

What have been some of the best and most productive ideas that have come forth?

Mr. STEWART. Well, there are a number of specific program ideas that have been outstanding. I think the issue that has captured most of the attention and offers—well, much as I understand—the most opportunity for learned long-term major accomplishment in energy efficiency in buildings has been the concept of private financing for public buildings.

That has been an issue; the availability of resources has been an issue since I've been involved in this for the last 7 or 8 years. It is clearly a concern on the part of every nonprofit manager I'm aware of.

The availability of up-front capital is crucial to them—the competition for capital that is available to them in terms of increased services, teacher salaries, or new pieces of equipment in hospitals, as compared with energy efficiency. Energy efficiency winds up losing in that contest.

The inherent delays in making capital available to nonprofit institutions and particularly governments after the decision is made to undertake a retrofit, in many instances may be 1 year or 2 years before the capital is finally available. During that time, they may well have lost as much as they could gain before they even began, and the opportunity to have some of the most knowledgeable, experienced people managing the installation of those measures and managing the further operation of those measures is something that most institutions, particularly smaller institutions, simply couldn't afford.

So this kind of arrangement has incredible potential for them for the long term.

Senator EVANS. Yes.

Mr. STREB. I'd like to offer, too, that the concept of shared savings, when coupled with the concept of least cost planning by utilities, is really a very powerful tool as more and more utilities become involved and incorporate least cost long-range planning, which as you know includes not only the planning of new generation capacity, but also looking at the bigger picture of how they can improve on the demand side.

I think we have a powerful tool, indeed, to incorporate conservation, because the utility then can help their users, in particular their large users, recognize areas in which efficiency improvements can be made and can assist them in affecting the appropriate coupling between themselves and the shared savings offeror or company.

Senator EVANS. Implementation of the shared savings provision in the reconciliation language will require new procurement regulations to be written. Do you—will the DOE formulate those for all Federal agencies, or are we going to get into a zoo of each agency writing their own?

Mr. STREB. I certainly hope that we don't get into a zoo of each agency writing their own. We do have, in places I mentioned earlier, a pilot program that involves the Department of Defense, specifically the Navy, that has identified five facilities that will be the subject of shared savings improvements.

The implementation at those five facilities will, of course, require procurement action and the development of new regulations is necessary in order to bring the contractors into place. We hope to learn from that. That will become essentially a test ground of what is required in the way of procurement regulations that can then be disseminated via the 656 Committee of the Federal Energy Management Program to all agencies for incorporation into their procurement regulations.

Senator EVANS. Thank you both very much. We have several other questions that we'll ask for the record, submit to you to respond for the record.

We appreciate it very much. We'll have a short recess. As I said, we'd get interrupted, and this is the first of the interruptions. I'll go over and vote and be back in less than 10 minutes.

Mr. STEWART. Thank you, Senator.

Mr. STREB. Thank you, Senator.

[Recess.]

Senator EVANS. If the hearing will please come back to order, panel 2, Mr. Mark Haas, director of the Policy and Research Division of the Energy Administration, Michigan Department of Commerce; and Ms. Julie Burman, public affairs officer, Washington State Energy Office.

We welcome you both to the panel. Mr. Haas, please proceed.

STATEMENT OF MARK P. HAAS, DIRECTOR, POLICY AND RESEARCH, MICHIGAN ENERGY ADMINISTRATION

Mr. HAAS. Thank you, Senator Evans.

I would like to spend some time today providing you with a sampling of the efforts that Michigan is undertaking in two areas. The first area will focus on energy conservation initiatives, and the second area will summarize some activities we're doing in electric utility planning efforts.

A copy of my prepared testimony has been provided for the record. I will summarize that testimony here.

The first part of my testimony will tell you about how Michigan's Energy Administration is combining Federal and State dollars to provide energy conservation programs aimed at helping businesses and public institutions reduce energy costs.

I would like to give you some examples, each of which not only identify energy conservation opportunities, but also assist in obtaining financing to implement those energy efficiency improvements.

The first example is our Small Business Energy Analysis Program which has provided services to more than 3,600 Michigan businesses. This program provides three on-site analyses of energy use in small commercial and industrial buildings, and then calculates the cost and expected returns of 11 specific energy efficiency improvement measures.

The analyst's report details projected energy cost savings for 5 years and the expenditures required to implement each recommendation. The report is then explained to the business owners in a manner designed to make clear how they may cut energy wastes and reduce operating cost.

Many of the recommendations require minimal investment on the part of the business. However, when a significant investment is required, our office provides consultation on the use of performance contracting, one type of financing approach that does not require the business to put any capital up front.

Because this program is available to Michgian businesses without charge, it nicely complements Michigan's Commercial and Apartment Conservation Service, or CACS Program. Many very small businesses who are unable to afford the more expensive CACS audit will call on us for assistance.

We use locally recruited Energy Aministration-trained analysts. The advantage of this approach is that the local analysts are more readily welcomed by the local business people; our costs are kept low, and we provide significant part-time work to unemployed or underemployed persons.

Based on our 1982–83 program year results, the first year average savings for each business receiving this service was about four times the cost of providing the analysis.

My second example is a new program the Energy Adminstration will begin to offer small businesses in 1986. This new program will encourage cost-effective energy savings investments by helping businesses identify energy efficiency improvements that cut operating costs not only in the heating and lighting areas, like the program I just mentioned, but also in industrial process energy use as well. This will be done by a similar process, that of providing information about energy efficiency improvements, and various options for financing those actions.

Because we'll be only able to reach a small number of businesses with this program, as it is a very in-depth and comprehensive activity, we'll be providing case study results and disseminating that information to other similar types of small businesses.

The two programs that I've just spoken about are funded jointly by Federal/State Energy Conservation Program and Energy Extension Service grant funds, as well as Michigan State general fund dollars.

You have already heard about the Federal Schools and Hospitals Programs. We are also interested in helping our schools and hospitals contain overall costs, particularly energy costs.

My third example shows how a small investment in Federal/State and Energy Conservation dollars, as well as State general fund dollars, can create new business activities as well as save energy. Two years ago, our office invited the Michigan Hospital Association to cosponsor with us a demonstration project of third party performance contracting as one innovative approach to financing major energy efficiency retrofits in Michigan hospitals.

In response to our proposal, the Michigan Hospital Association counterproposed the development and operation of a new energy efficiency financing service through its for-profit affiliate organization, the Michigan Hospital Service Corp.

Our office supported the proposal with a $50,000 grant in seed money to help cover the costs of assessing the market for such services, as well as to assist them in developing model contracts and "how to" manuals.

This spring, the Michigan Hospital Association began offering the service of something called the Energy Trust. This Energy Trust provides a package of services to Michigan hospitals. These services include a detailed energy audit; equipment design; installation and monitoring; project financing; and the operation and maintenance education for energy management equipment.

The unique feature of this program is that the Energy Trust, not the client hospital, assumes responsibility for payment of all project costs. The Energy Trust is currently negotiating contracts with 16 Michigan hospitals and has requests from an additional 15 hospitals. The first contract is in the process of being signed this week. Some of the signatures were completed before I traveled here.

My fourth example relates to public schools. Two weeks ago, the Lansing School District completed negotiations with Time Energy Systems of Houston, TX for the installation of energy efficiency improvements in 10 school buildings. The school district is investing only $300,000 of its funds into the project, while Time Energy Management is providing the remaining $1.3 million required.

The first year energy savings from this project will pay the salaries of about 15 teachers. Much of the work in the 10 buildings will be subcontracted by Time Energy to local Lansing area small businesses employing Michigan workers. We believe that putting Texas dollars to work in Michigan schools, to provide jobs for Michigan workers, and to free up dollars from school districts' fuel purchase budgets to finance additional teachers for our kids is darn good business, as well as an important energy conservation activity.

I would like to note that the Lansing School District decided to make this move because the Energy Administration, through its energy efficiency financing program, showed them how to make use of performance contracting and provided the legal, financial, and technical information required at critical phases of the project.

Again, the dollars for this support were provided from a joint funding of Federal/State energy conservation dollars and the State's general fund.

Despite all these efforts, there are still thousands of small businesses in Michigan and many schools and hospitals that have not yet been served by our programs and still need the type of assistance that we are providing. We believe that such assistance is only possible by combining State and Federal support.

The second part of my testimony describes a major Michigan initiatve in the electric utility area. An Energy Administration review of Michigan's electric situation led to the conclusion that a cooperative effort between utilities' customers and regulators would be required to assure adequate, reliable, and cost-effective supply of electricity for Michigan's economy in the future.

This is important if Michigan businesses are to remain competitive in world markets. I'm sure Senator Evans is aware of the major industrial activities in Michigan and the increases in competition from other nations.

The Michigan electricity option study is a 2-year $4 million cooperative effort between Michigan utilities, business, industrial and residential customer groups, utility regulators, labor unions, environmentalists and other interested parties. A 21-member advisory committee provides a forum for discussing various points of view about the content and direction of the study. I've attached a list of advisory committee members to the record.

In short, the study will try to do five things:

One, it will try to determine the likely range and type of demand for electricity services through the year 2005.

Two, it will try to identify and analyze all major electric supply and demand side resource options.

Three, it will try to determine which combinations of those resources will reliably and cost effectively meet the State's future electricity needs.

Four, it will try to identify cost-effective implementation strategies that can be modified as conditions change. The only thing we know with certainty is that whatever we predict will happen is not likely to happen.

Five, it will try to develop methodologies and compile a comprehensive base of information that can be used in the future by utilities, customers, regulators and public policymakers in planning for future electricity needs.

This approach represents a shift from traditional utility resource planning which primarily looked only at conventional central station power plants to meet future needs. We intend to consider all major supply and demand side options in the study. The work on the study is done by about 150 people, divided into six work groups which represent all of the various interested parties in the study.

We believe that in their work, we will also have to determine the major uncertainties associated with future electricity demand and the various resource options cost, reliability, availability, et cetera, and be prepared to respond to changing circumstances by developing strategies for managing risk.

We believe that what we are doing in Michigan may be something that other States and regions can benefit from, as we have benefited from the activities that have happened in other States and regions.

I would like to conclude my statement by suggesting three ways the Federal Government can encourage and assist businesses, institutions, utilities and individuals in containing energy costs and helping keep America competitive in world markets.

First, you may provide leadership by example through the use of innovative financing of performance contracting for energy conservation improvements in Federal Government buildings. This may require that you remove some legal barriers to the use of innovative financing and performance contracting arrangements in government facilities. However, once those legal barriers are removed, the next step may be for Federal contracting and procurement guidelines to be appropriately modified to allow greater use of these financing arrangements. We are now working to do this in Michigan government.

A second suggestion I have is that you may want to continue to provide support for innovative financing arrangements, technical assistance, and information dissemination. This last item of information dissemination is particularly important because the use of performance contracting for energy efficiency improvements is a quickly developing practice. And distribution of things like "how to" manuals will help assure an orderly development of the use of these financing mechanisms.

Maintaining funding levels for State energy conservation programming is a minimum requirement for assuring continued orderly development of these strategies. As was stated earlier, although the Federal Government has done some of this for schools and hospitals, more needs to be done for municipal governments and small businesses.

Finally, you may wish to continue and expand the leadership role the Federal Government has already taken in the area of utility resource planning as demonstrated by such activities as the Northwest Power Planning Council.

We would like to see support of similar efforts in other parts of the nation which reflect region-specific needs and are not necessarily dominated by a Federal Power Administration. In my travels out to meet with Northwest Power Planning staff to get their advice on our project, I was interested to find out how different their situation really is than ours and how the tools and techniques that we will need to use are somewhat different, although similar.

Although the support could be done by congressional mandate requiring regional utility planning, another way that it could be done would be by providing some type of incentive to encourage such plan. As a State, we prefer the carrot to the stick approach.

An example of an incentive that the Federal Government could provide would be to direct the U.S. Department of Energy to work more closely with us in helping us develop and applying tools and information to this task.

I would like to thank you for inviting me here today, and I would be glad to respond to any questions you might have when Ms. Burman has had a chance to make her comments.

[The prepared statement of Mr. Haas follows:]

Testimony
on
Innovative Approaches to Conservation and Improving Energy Efficiency

Presented to the
U.S. Senate Committee on Energy and Natural Resources
Subcommittee on Energy Regulation and Conservation

By
Mark P. Haas, Policy Director
on behalf of

Terry R. Black, Energy Administration Director
Department of Commerce
State of Michigan

October 18, 1985

Thank you, Chairman Nickles and members of the subcommittee, for inviting me to speak today on some of the innovative things Michigan is doing to encourage energy conservation and improve the efficiency with which we use energy resources. I am Mark Haas, Director of Policy and Research for the Michigan Energy Administration, delivering these remarks on behalf of Terry Black, the Director of the Energy Administration.

To provide you with a sampling of our efforts, my testimony today will outline two of the types of activity in which we are currently involved. The first part of the testimony will focus on energy conservation initiatives and the second on a comprehensive study of options for meeting future electricity needs.

I. Energy Conservation/Efficiency Program

The purpose of the first part of my testimony is to tell you how Michigan's State Energy Office is combining federal and state dollars to provide energy conservation programs aimed at helping businesses and public institutions reduce energy consumption and energy costs.

I would like to give you four examples. The first is our Small Business Energy Analysis program which has provided services to more than 3,600 small businesses across the state.

The Small Business program provides free, on-site analysis of energy use in small commercial and industrial buildings. An analyst trained by our staff evaluates the building envelope and the lighting and then calculates the costs and expected returns of eleven specific conservation measures commonly recommended for small business facilities. The analyst's report details projected energy cost savings, 5-year cost avoidance, and required expenditures to implement each recommendation. When the report is complete, it is explained to the business owners in a manner designed to make clear how to cut energy waste and reduce operating costs. While many of the recommendations require minimal investment on the part of the business, for those businesses which face a significant investment in order to capture major savings our office provides consultation on the use of performance contracting, a financing approach that requires no upfront capital.

There are several interesting twists to this program:

- because it is available to businesses without charge, it nicely complements Michigan's Commercial and Apartment Conservation Service (CACS) program. Many very small businesses who are unwilling or unable to afford the more extensive CACS service because of its costs call on our program for help.
- because we use locally recruited, Energy Office trained analysts and pay them $7.50 per hour for providing the service. The advantages of this approach include the fact that local people are more readily welcomed by local business people; our costs are kept low ($60 per analysis); and we provide significant part-time work to more than 200 unemployed or under-employed persons.
- because it produces multiple benefits. Based on our evaluation of 1982-83 program results, the first year average savings for each business receiving the service was about four times the cost of providing the analysis. These savings continue for the business, and many of the saved dollars circulate in the local economy rather than leave the state to purchase fuel which, without the program, would have been wasted.

Funding for this service comes from our federal State Energy Conservation Plan (SECP) and Energy Extension Service (EES) grants and from the state's General Fund.

My second example shows how a small investment of federal SECP and state General Fund dollars can create new business activities.

Two years ago, our office invited the Michigan Hospital Association (MHA) to co-sponsor with us a demonstration of third-party performance contracting as one innovative approach to financing major energy efficiency retrofits in Michigan hospitals. MHA counter proposed the development and direct operation of a new energy efficiency financing service through its for-profit affiliate organization, the Michigan Hospital Service Corporation. Our office supported the counter proposal and provided MHA with seed money ($50,000) to cover the costs of assessing the market for such a service and to assist with some of the development costs.

This spring the Michigan Hospital Association began offering to Michigan hospitals the services of The Energy Trust. The Energy Trust offers hospitals a risk-free, turn key package which includes the following services aimed at cutting hospital energy costs:

- detailed energy audit
- equipment design
- innovative project financing
- installation and monitoring
- operation and maintenance education for energy management equipment
- energy conservation promotional services.

A unique feature of the program is that The Energy Trust, not the client hospital, assumes responsibility for payment of all project development costs. Financing for a project can be obtained at substantially reduced interest rates, and equipment purchased for the project becomes the hospital's property, generating immediate energy savings.

The Energy Trust is currently negotiating with sixteen Michigan hospitals and has requests for proposals from fifteen additional hospitals. At the time this testimony was being prepared, the Energy Trust was obtaining signatures for its first contract--one of significant scope. The Trust's first project will construct a cogeneration plant for a 427 bed hospital in 22 months. (If utility costs increase at 8 percent per year, energy savings through 1996 would be approximately $26,000,000.) Similar project contracts are expected to be executed with four or five Michigan hospitals by January 1986.

My third example relates to the public schools in Lansing, Michigan. This week the Lansing School District is completing negotiations with Time Energy Systems, Inc., of Houston, Texas for the installation of energy efficiency improvements valued at approximately $1.5 million in ten school buildings. These improvements are expected to cut energy expenditures for the district in the first year by about $415,000. The project will be paid off in five years from avoided energy costs. The school district is investing only $300,000 of its own funds in the project, and Time Energy is providing the remaining $1.2 million.

It is important for you to note, I think, that the annual energy cost savings that will be achieved from this project will pay the salaries of about 15 teachers. Further, much of the work on the ten buildings will be subcontracted by Time Energy to Michigan Boilers and Engineering, United Piping, Delta Electrical Contractors, and Leeds Heating and Cooling--all local Lansing area small businesses employing Michigan workers. The project is expected to be completed and operating by July 1986.

We believe that putting Texas dollars to work in Michigan schools, thereby providing jobs for Michigan workers and freeing dollars from the district's fuel purchase budget to finance additional teachers for our kids, is darn good business, as well as an important energy conservation activity.

I would like to emphasize that the Lansing School District decided to make this move because our State Energy Office, through its Energy Efficiency Financing (EEF) program, showed them how to make use of performance contracting and provided expert legal, financial and technical information at critical phases of the project. Model legal and financial documents, a "how-to" guide, and valuable lessons learned during this demonstration are currently being disseminated to school districts throughout Michigan. Parallel efforts in the municipal, small business and multi-family housing sectors have been implemented by my office in cooperation with membership associations. During the next year, greater focus on information services to Michigan contractors is planned, thus encouraging the growth of an instate industry of energy service companies, needed especially to meet the growing demand by smaller public and private sector entities for innovative energy financing. The dollars to support the EEF program came from our federal SECP grant and from the state's General Fund.

A fourth example is a new program through which the Energy Administration Clearinghouse will offer energy conservation services to Michigan small manufacturing and industrial businesses. This new program will encourage cost effective energy saving investments by helping businesses identify energy efficiency improvements that cut operating costs. The program will provide the following services to achieve this purpose:

-- Collect and organize a business' energy cost and use data in a practical format which encourages the business to maintain an energy accounting system.

-- Prepare an energy profile of the business which identifies areas with high potential for cost containment.

-- Assist the business in reviewing demand and power factor data to identify cost-cutting opportunities.

-- Research and provide information concerning new or alternative technologies which may offer energy efficiency advantages for the business.

-- Identify equipment and building retrofit opportunities for reducing energy costs.

-- Provide information about energy project financing options and a preliminary comparative computer analysis of each option.

-- Provide technical assistance in the use of performance contracting.

Where the program, using one or more of these services, is able to contribute to a business' achieving significant energy cost reductions, a case study will be written and used to disseminate the information to similar businesses around the state.

The program's services, funded from federal Energy Extension Service grant funds and state general purpose revenues, will be offered at no charge to approximately 25 Michigan businesses each year.

To conclude this part of my statement, I want to point out that there are thousands of small businesses in Michigan that have not yet been served by our small business program and that there are hundreds of public institutions that still need the type of assistance we are providing to some of our hospitals and schools. There is much yet to be done, and each time we provide assistance we make a significant contribution to economic development, as well as energy conservation and efficiency. Such assistance is possible only by combining federal SECP and EES dollars with our very limited state resources.

(I will leave additional information about our program with your staff, including a copy of a "How to Manual" which explains the details of performance contracting for public schools. We have developed similar manuals for use in the small business, local government, and multi-family housing sectors.)

II. Michigan Electricity Options Study

The second part of my testimony describes a major Michigan initiative in the electric utility area.

Because things have changed a great deal in the electric utility business in recent years, the old way of doing things--where utilities finance and build new power plants and, upon commercial operation, present the final bills to customers--does not seem to work well anymore. Investors are hesitant to risk billions on power plant construction; utilities are confronted with power supply planning under ever-changing circumstances; and business and residential customers are faced with the potential for dramatic rate increases.

In Michigan these realities were publicly highlighted through news reporting of the Consumers Power Midland cancellation negotiations, Detroit Edison's 968 million dollar rate request (to cover two major power plants), and Consumers' seven billion dollar investment recovery case and financial difficulties. In response to the new realities, as well as public concern over the cost and availability of power and the need to avoid a Midland recurrence, Governor Blanchard proposed that new approaches to meeting future power needs be considered.

An Energy Administration review of Michigan's electric situation led to the conclusion that a three-part approach would be required to assure an adequate, reliable, and cost effective supply of electricity for Michigan's economy in the 1990's and beyond. The three-part approach adopted by the Blanchard Administration involves: (1) completion of a comprehensive electricity options study; (2) enactment of electric resource planning legislation; and (3) the removal of barriers and adoption of incentives to encourage utilities and their customers to pursue cost effective (the optimal mix of) resource options. (We believe that all three parts are essential and that failure to achieve any of the three would severely limit the effectiveness of the other two in assuring that future power needs are met in the most economical way.)

Today, I will focus on the first step in this approach, completion of a comprehensive Electricity Options Study. In addition to addressing the problems of power supply cost and reliability--which are vital to Michigan's economic growth and competitive position--this study will examine the costs and benefits of all technically feasible conservation, efficiency and demand modification options for meeting electric resource needs, as well as traditional supply options. All options will be considered on the same basis, whether traditional power plants, renewable energy resources or newer demand-side options.

The Michigan Electricity Options Study is a two year, 3.5 to 4 million dollar, cooperative effort between Michigan's utilities, customer groups, utility regulators and other interested parties. A 21-member Advisory Committee provides a forum for discussing various points of view about the content and direction of the study. (Attached is a list of Advisory Committee members.)

The Study participants are divided into six work groups, each with between 15 and 35 members, made up of staff and representatives of the Energy Administration, the Public Service Commission, utilities, business and residential customer groups, environmental groups, labor unions and other interested parties. Assisting these work groups will be a number of consulting firms and research organizations familiar with various aspects of electric power resource planning.

In short, the study will try to:

1. Determine the likely range and type of demand for electricity through the year 2005.
2. Identify and analyze all major electric supply- and demand-side options.
3. Determine combinations of options that will reliably and cost effectively meet the state's future electricity needs.
4. Identify cost-effective implementation strategies that can be modified as conditions change.
5. Develop methodologies and compile a comprehensive base of information that can be used in the future by utilities, customers, regulators, and public policy makers in planning for future electricity needs.

This approach represents a shift from traditional utility resource planning which typically looked only (or primarily) at conventional central power stations to meet future needs. We intend to consider all major supply- and demand-side options. (The attached graph depicts the difference in planning approach.)

The major tasks of the study include:

1. Identifying all major supply- and demand-side options.
2. Assessing the technical potential of each option to contribute to meeting future electricity needs.
3. Determining the lead times required to bring each option "on line."
4. Evaluating the economic feasibility (cost and benefits) of each option and implementation strategy.
5. Identifying and assessing other considerations:
    a. Financial
    b. Environmental
    c. Legal, institutional
    d. Political
6. Determining the flexibility and uncertainty of each option and developing methods to manage the associated risks in a cost-effective manner.

We believe that this last point--determining the major uncertainties associated with future electricity demand and the various resource options (cost, contributions, lead time, etc.) must be given explicit consideration. Utility planning must be better prepared to respond to changing circumstances, that is, develop more flexible strategies for meeting future electricity needs.

We believe that the study we are coordinating will develop tools and data that will facilitate better electric resource planning. In addition, we believe the study's results will be used for three important purposes:

1. To help utilities and their customers make better informed decisions about cost-effective combinations of supply- and demand-side options;
2. To assist our Public Service Commission in evaluating proposed electric resource plans, a task which requires consideration of the cost-effectiveness of various approaches to meeting future needs; and
3. To guide state policy makers in framing incentives for/or removing barriers to the implementation of the most cost-effective resource options.

Thank you for inviting me here today. I would be glad to respond to any questions you might have.

MICHIGAN ELECTRICITY OPTIONS
ADVISORY COMMITTEE

JULY 1985

Terry Black (Project Director)
Energy Administration

William Black
Indiana & Michigan Electric Company

Jack Brown
Michigan Manufacturers Association

Tom Butler
International Brotherhood of
Electrical Workers, Local 58

Kay Dodge
Center for Environmental Study

Roger Fischer
Public Service Commission

Sam Fishman
Michigan State AFL-CIO

John Galles
Small Business Association
of Michigan

George Gildersleeve
Upper Peninsula Power Company

George Graff
Michigan State Chamber of Commerce

Gordon Heins
Consumers Power Company

Larry Jones
Michigan Business Utility
Users Committee

Ray Kuhl
Michigan Electric Cooperative
Association

John Lobbia
Detroit Edison

John Medler
General Motors

Pete Plastrik
Governor's Cabinet Council

Don Potter
Michigan Municipal Electric
Association

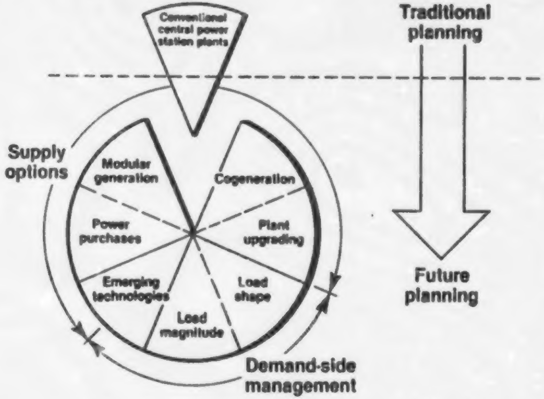
Bob Smith
Michigan Farm Bureau

Stan Steinborn
Chief Assistant Attorney General

Joe Tuchinsky
Michigan Citizens Lobby

Emil Vredenburg
Michigan State Utility Workers

The complexity of current and future options stretches the limitations of traditional planning categories and techniques.


Conventional central power station plants
Supply options
Modular generation
Power purchases
Emerging technologies
Load magnitude
Load shape
Plant upgrading
Cogeneration
Demand-side management
Traditional planning
Future planning

Options . . .

- **Appear over time**
- **Evolve over time**
- **Disappear over time**
- **$ to create**
- **$ to exercise**
- **$ to abandon**
- **Are different:**
  - **—cost**
  - **—performance**
  - **—lead time**
  - **—response time**
  - **—availability**
  - **—stand alone value**
  - **—strategic contingency value**
  - **—regional application**

Balanced consideration must be given to all options.

Senator EVANS. Thank you very much, Mr. Haas.
Ms. Burman.

STATEMENT OF JULIE BURMAN, PUBLIC AFFAIRS OFFICER, WASHINGTON STATE ENERGY OFFICE

Ms. BURMAN. Good morning. It's a pleasure to be here today from Washington State. I've worked for 2 years on energy performance contracting issues and I'm also a member of the industry Public Sector Advisory Board, the NAESCo Public Sector Advisory Committee.

I'd also like to share with you the experiences that we've had on innovative financing for energy efficiency improvements in public facilities in our State. I do believe that this is one thing that can help ensure that least cost energy future of the Northwest.

I'd also like to mention at the end of my remarks some things that we're doing in the industrial and commercial sector that are not part of my written testimony.

Washington State agencies, as well as our local government, recognize that there is substantial opportunity for energy and dollar savings within public facilities. Much of that has been documented. Unfortunately, much of that documentation sits on bookshelves and does not get implemented, I think primarily because of dwindling public funding sources, as well as competing priorities for those dollars.

Consequently, a couple of years ago, our office started an innovative financing demonstration project funded by the Federal Department of Energy. And it was good to hear this morning from Frank Stewart that we're one of their "flagship" projects.

The goal of our project was to achieve private financing for local governments. We were definitely interested in working in local governments in Washington, and we saw ourselves as kind of a broker between the energy service industry and these local governments.

We had a number of questions that we wanted to find answers to. Were our electricity prices too low in the Northwest to attract these companies? Was our geographic location a barrier? Would our clients, the municipal governments, be skeptical of these arrangements? Would there be new local energy services companies opening up in the Northwest? And really, was it legally possible for municipalities to contract with an energy services company? What about this multiyear contracting issue?

Also, we were concerned about the credibility of the energy services company and careful about our role in terms of endorsing it. Also, I know that one of the things that you, Senator Evans, are interested in is this idea of "cream skimming" and how do you get at some of the more long-term retrofit items. Those were all things that we sought to answer.

And we came up with some of the answers to those questions as we worked with the city of Spokane, Spokane County, and the city of Yakima. We assisted those three local governments in identifying projects that could attract private financing, helping them solicit and evaluate proposals, and also we identified a procurement barrier along the way and overcame it.

The result of our project is that as we speak, the city of Yakima is negotiating a shared savings contract with a Colorado firm. The energy services company will not only finance an energy management system but, because the payback is so short in that system, the city of Yakima has negotiated financing of their roof insulation as well.

The city of Spokane is negotiating with the Spokane office of a national firm for about $500,000 of new boilers in some buildings that were originally built for their World's Fair about 10 years ago. Those buildings were intended to be torn down soon after the fair was over, so they didn't put much thought into the conservation and energy use in those buildings. We're helping to make those buildings more efficient because they're still being used.

The third jurisdiction that we worked with, the county of Spokane, decided after they looked at the engineering analysis as well as the economic analysis, that they could self-finance those projects and decided to get all of the share of the savings.

During the process, we answered the questions that we had posed for ourselves; that our low electricity prices were not an automatic barrier but, depending upon fuel mixes and particularly very high energy consumption per square foot, we could attract energy services companies to the Northwest.

Also, our geographic location was not a barrier. Many energy services companies see the institutional sector as their market. The barrier there for them is that often the public sector has not put forth reasonable requests for proposals. Ours were reasonable and they were very enthusiastically responded to.

Many building owners are initially skeptical of this energy services concept, both in the public and private sector. It sounds too good to be true. This is a marketing challenge for the industry and I think it's a role that government can play in terms of providing information to building owners about the concept.

Over the past 2 years, about 15 energy services companies have started in the Northwest and two of those are unregulated subsidiaries of private electric utilities.

As a result of our work with the the three local governments, as I mentioned before, we did identify a procurement barrier. The barrier was not absolute. However, we felt that because municipalities would have been required to go through two procurement statutes, one to hire engineering expertise and another to go out for public bids, this would be risky for the energy services companies, as well as costly in terms of the procurement process, as well as confusing for the local governments. So our office, the Washington State Energy Office, sponsored legislation to clean up these procurement laws.

The new law was passed unanimously in our 1985 legislative session. It was sponsored by a Democrat from western Washington as well as a Republican from eastern Washington. As I said, it passed unanimously and was supported by both the local governments as well as the energy services companies. So both Yakima and the city of Spokane are now negotiating their contracts under this legislation.

To help building owners avoid what we saw as the "cream skimming" problem, we ended up recommending to these local governments and now to other building owners, that they ask the energy services companies for a complete picture of their energy conservation potential through the audit process. With this list of all the potential measures, the building owner and the energy services company can negotiate which things the energy services company is willing to pay for and that, of course, could influence the term of the contract.

As I mentioned before, Yakima is willing to extend the term of their contract and give the energy services company a greater portion of the energy savings in exchange for insulation of their roof.

So with this full disclosure of opportunities, the building owner can also consider self-financing of some of the measures and possibly other funding sources such as those that come out of our office.

Of course, this has complex implications sometimes in terms of how you figure out who gets what share of the savings. The energy services company is very interested in getting the share of the savings that are attributable to their investments, and so that could be a very tricky thing and more work needs to be done in that area.

We've learned several lessons through this project. One of those is that energy services companies are fearful of bureaucratic procedures as well as unrealistic requests for proposals. We feel that in Washington State, our recent legislation as well as our model request for proposals, are a major step in terms of eliminating that concern for local government projects in our State.

Public facility owners, as well as other building owners, are interested in securing private financing, but unfamiliar with the energy services concept. To meet this need, our office as well as the Department of Energy and other people are preparing a number of documents that I think can help overcome this.

Of course, money should not be the only consideration that a building owner goes into an energy services contract. There are other advantages in that you can assign the risk of the equipment performance to the energy services company, as well as picking up maintenance services and/or staff training.

Our evaluation of our project is that it has been a success. All three local governments are implementing energy efficiency projects that otherwise probably would not have been done.

It's also clear to us that much of what we learned with local governments is transferable to State government. Therefore, that's our next target plan group.

Identifying good projects will be easy. We've been monitoring the energy consumption of all State facilities for several years. However, it's also clear to us that the State bureaucracy will be a tougher client than local governments. There are several reasons for this, although I think that one of the biggest ones is that there's a loss of budget which results when money is saved through energy projects by aggressive State agencies.

If any agency reduces its energy consumption, its budget for energy in the ensuing biennium is cut to reflect current needs. This in essence serves as a disincentive. I think if there is top-level support within any agency, such as you, Senator Evans, talked about the other day at the NAESCo Conference, as you did when you were the president of Evergreen State College, that can go a long way to encouraging the business people within an agency, as well as the maintenance people, to go for the first year energy savings.

However, we are beginning to have conversations with the executive as well as the legislative branches to see if there are some reasonable incentives that we can come up with to reduce the hesitation by State agencies. We believe that this is an additional area that our office has a significant and useful role.

Not mentioned in my formal testimony were a couple of projects that our office is involved with in the industrial and commercial sector. One of the things that we're quite excited about had its beginning in the Power Council's plan of a couple years ago. That was the idea to do a new commercial buildings field test. Our office bid competitively for the opportunity to do that project and were awarded it by the Bonneville Power Administration. So we're going to be working with developers of commercial office buildings, hotels, motels, grocery stores, and other commercial buildings to build 14 of these energy-efficient buildings in our State.

It will be the responsibility of the developer and the architect and engineer, if selected by us to participate, to come up with a design for the building that is about 30 percent more efficient than current practice. Our office, with Bonneville funding, will pay for all of the design costs for that building as well as the cost of constructing that building through the building envelope construction, as well as any additional equipment that's required, and then we, along with Bonneville, will be monitoring the consumption of that building for several years.

So, throughout the Northwest, there will be about 32 of these highly energy efficient buildings built.

Another project that our office has just embarked on is the potential for a district heating project in Olympia. The project would use waste heat from the wastewater treatment plant in Olympia to heat the downtown business core, as well as the capital campus.

We're just beginning on that project and would be also looking at the opportunity to finance this with some kind of private financing. It's all several years down the road; we're in the feasibility assessment area with that now.

Our staff is also working with a timber mill down in the Longview area to see about the possibility of converting that from natural gas to using the waste wood that comes out of the mill. Now, we have had some discussions with energy services companies about that project and are very interested in seeing if we can secure private financing for that project.

In the Northwest, our office has just begun some discussions with Bonneville as well as the aluminum industry about opportunities to make the aluminum industry more energy efficient, and those discussions are, as I said, just beginning, but we're hopeful that we again can play a role, kind of a brokering role between the industry and opportunities for energy efficiency.

I would echo many of Mr. Haas' comments about what the Federal Government can do with your own buildings. I would encourage you not to create a zoo in terms of your procurement regulations. I would encourage you to work with the Department of

Energy to continue sponsoring projects with State energy offices as well as providing the information sharing that's so important.

Thank you for the opportunity to be here this morning.

[The prepared statement of Ms. Burman follows:]

STATEMENT OF JULIE BURMAN

PUBLIC AFFAIRS OFFICER

WASHINGTON STATE ENERGY OFFICE

to the

Subcommittee on Energy Regulation and Conservation

of the

Senate Committee on Energy and Natural Resources

October 18, 1985

Chairman and members of the Committee:

Thank you for inviting me to appear before you today. I've worked for two years on energy performance contracting issues at the Washington State Energy Office (WSEO) and I am also a member of the NAESCo Public Sector Advisory Committee. I'd like to share with you the experience we have had with innovative financing for energy efficiency improvements in public facilities in Washington State.

Washington State agencies and local governments recognize that there is substantial opportunity for energy and dollar savings within public facilities. Engineering and economic analysis of this potential has been documented. However, many cost-effective energy efficiency projects have not been implemented because of dwindling public funding sources and competing priorities for scarce dollars. Consequently, in mid 1983, our office began an innovative financing demonstration project which was funded by the Department of Energy.

The Project

The goal of the innovative financing demonstration at WSEO was to achieve private financing for energy projects in public buildings and facilities. Local governments were targeted as our client group. The first step was to become familiar with the energy service company (ESCo) industry and also to begin answering the following questions:

1. Would the Northwest's relatively low electricity prices be a barrier to structuring attractive arrangements with ESCos?

2. Was our geographic location a barrier to the national ESCo industry?

3. Would local governments be skeptical of new financing mechanisms?

4. Would there be new, local ESCos?

5. Was it legally possible for local governments to contract with an ESCo? What about multi-year contracting?

6. What about the credibility of the ESCo industry?

7. Would the ESCo concept emphasize "cream skimming" of conservation opportunities?

The answers to these questions came over time as we worked with the City of Spokane, Spokane County, and the City of Yakima. (WSEO findings to these questions appear on page 4-5 of this testimony). WSEO assisted these three local governments in identifying projects that had the potential to attract private financing. We then worked with them to solicit and evaluate proposals from ESCos. Along the way we also identified and legislatively overcame an institutional procurement barrier to energy performance contracting.

The Result

The City of Yakima currently is negotiating an energy performance contract with a Colorado firm. The ESCo will privately finance an energy management system and other conservation equipment for Yakima's City Hall.

The City of Spokane is negotiating an energy performance contract with the Spokane office of a national firm for $500,000 of new boilers for their Opera House and Convention Center, Library, and Theatre, as well as an energy management system for most City-owned buildings in the downtown area.

The third jurisdiction, the County of Spokane, was interested in a new outside air system for its Public Safety building. The County decided to self-finance the project after reviewing the preliminary engineering and economic studies which indicated a simple payback period of two to three years.

During the process of working with these three communities, we learned that:

1. The Northwest's low electricity prices are not an automatic barrier to financially feasible deals. There are many public and private buildings that offer significant cost-effective conservation opportunities through a mix of fuels and/or very high energy consumption per square foot.

2. Washington's geographic location was not a barrier to receiving proposals from national ESCos. Many ESCos view the institutional sector as their market and will respond to reasonable RFPs.

3. Most building owners are initially skeptical of the ESCo concept. This is a marketing challenge for the ESCo industry and an informational role that can be facilitated by government.

4. There are approximately 15 Northwest ESCos operating today, most of which were formed over the past two years. Two are unregulated subsidiaries of private electric utilities.

5. As a result of WSEO's work with these three local governments, a need for simplification of procurement statutes was identified. The barrier was that dual statutes applied — one to hire engineering expertise and another to obtain bids for public works.

   WSEO sought state legislation that would allow a municipality to procure performance based energy contracting as they do engineering services. This facilitates negotiation of the entire contract rather than requiring an additional public works bid process.

   The new law (Chapter 169 Washington Laws 1985) was supported by both local governments and ESCos. The bill passed unanimously and became law in July 1985. (An example of the contracting procedures under the old and new law is attached).

6. The credibility of the industry is being advanced by the National Association of Energy Service Companies (NAESCos). WSEO applauds NAESCos efforts to develop ethical standards and work on a certification process.

7. To help building owners avoid "cream skimming", we recommend that owners ask ESCos for a complete picture of their energy efficiency opportunities through the audit process. With this list of all potential measures, the ESCo

and building owner can negotiate which items the ESCo will finance under various contract terms.

For example, the City of Yakima is extending their contract term to include roof insulation. This is feasible because of the relatively quick payback of the energy management system.

With the full disclosure of opportunities, the building owner can also consider self-financing and/or other funding sources for additional items not financed by the ESCo. Of course this has implications for the measurement of energy savings and the ESCo share.

Lessons Learned

Investors are interested in public facilities, but fearful of bureaucratic procedures and unrealistic RFPs. Our recent legislation and model RFPs are a major step in eliminating this concern for local government projects in Washington. Public facility owners are interested in securing private financing of their projects, but are unfamiliar with ESCOs and energy performance contracting procedures. To meet this need our office, as part of the demonstration project, is preparing a guidebook on energy performance contracting for both public and private building owners. In addition to explaining energy performance contracts and the basis of determining a building's energy efficiency potential, it outlines what to look for in an ESCo.

Of course, money is not the only consideration in bringing building owners and investors together. Assignment of equipment performance risk, along with maintenance service and/or staff training, are also key factors.

Next Step

WSEO's evaluation of the innovative financing project is that it has been a success. All three local governments that have participated in the program are implementing energy efficiency projects that otherwise would not have been pursued. More will likely follow once our guidebook and case histories are distributed.

It is clear to us that much of what we learned with this local government demonstration is transferable to state-owned facilities. Therefore, we are now working with state agencies to see what can be done to attract private capital to state agencies.

Identifying potential projects has been relatively easy since the State's Building Energy Management Program monitors energy consumption data for over 90 percent of the state's 52 million square feet of buildings. However, it seems that the state bureaucracy will be a tough client. Reasons uncovered for not implementing energy- efficient projects in state buildings include: general apathy, limited funding for maintenance and capital projects, limited expertise in maintaining sophisticated systems, and loss of budget which results when money is saved by aggressive state agencies. (If any agency reduces it energy consumption its budget for energy in the ensuing biennium is cut to reflect current needs. This, in essence, works as a disincentive for implementing energy improvements.) We are beginning conversations with the executive and legislative branches to identify reasonable incentive options to reduce hesitation by state agencies. We believe our office can again play an important role to bring state facility operators and private investors together.

Performance Based Energy Contracting

Why Legislation is Needed

Existing statutes do not prohibit performance based energy contracts, per se. They do, however, make the process for cities and counties very awkward and cumbersome, which adds to the risk and cost for both the municipality and the Energy Services Company (ESCo).

The awkwardness is due to the fact that if a municipality wants to contract with an ESCo it must comply with two sets of statutes, those that relate to public works and those that relate to engineering and architectural services. Since the success of performance based energy contracting depends on contract terms that are negotiated to mutual satisfaction the contracting process is more like that for engineering/architecture services than public works. The ability for a municipality to treat performance based energy contracting like that for engineering and architectural services--to negotiate the contract rather than to obtain bids--is the essence of this proposed legislation. This is the same authority that the state already has for the buildings it owns and operates. (HB1011, RCW 43.19.680)

Cities and counties will still be required to conduct a competitive selection process in choosing an ESCo if this legislation is adopted.

Following is a hypothetical example of a municipality going through the process of performance based energy contracting under both existing statutes and the proposed change.

Situation:

A first class city has a city hall constructed in 1949 that is used for office space and a jail. The heating, ventilation, and cooling system is gas and electricity. The building consumes nearly 196,000 Btus/sq ft/yr, approximately double the norm. Annual energy costs are approximately $87,000.

A preliminary analysis indicates that an energy management system (EMS) would save $52,000 annually and cost $65,000 plus $3,000 for annual maintenance. Insulation in the roof would cost $38,000 for an annual savings of $1,700.

The city has decided that it cannot fund the EMS for the following reasons even though the system would pay for itself so quickly:

1. Simply purchasing and installing the EMS does not guarantee its performance. Earlier, the city invested approximately $18,000 in an attempt to improve the existing system, to no avail. It is unwilling to again take such a risk. A performance based energy contract places the risk on the ESCo. In addition, since ESCos have a financial stake in the energy savings obtained, they will either maintain the system or train the city's personnel on how to operate and maintain it effectively. Such services are not part of a typical municipal contract.
2. There are competing demands on the city's capital resources.
3. While the city could justify self financing the EMS (due to the favorable payback), it could not do so for the roof which has a payback of 22 years. However, combining the two projects together yields a payback of two years, a payback that is attractive to an energy services company.

The Process:

Existing

1. The city decides to enter into a performance based contract.

2. Consistent with RCW 39.80, the city publishes a Request for Qualifications for a firm, an Energy Services Company (ESCo), to conduct energy auditing and engineering, financing, construction management, and training. Criteria for selection are qualifications and experience. The RFQ includes all of the known information about the buildings energy consumption and assumed energy conservation measures. This information is included so that the ESCos have something on which to base their proposals. The RFQ makes it clear that the actual installation of equipment will be by bid to a separate contractor.

3. ESCos respond with proposals that are based on information provided in the city's RFQ. These proposals include proposed financing arrangements (e.g., shared savings or guaranteed savings) and their experience in performance based energy contracting.

4. Following selection of the firm, the city negotiates the contract at terms fair and reasonable to the city. These terms include length of the contract, percentage of savings accruing to each party, etc. Also included in the negotiations are aspects of the equipment installation contract--the second contract--such as mechanisms for paying the installing contractor. This last point is the most difficult for the two parties to negotiate. The ESCo is being asked to guarantee the performance of equipment which it is not installing. In return for this increased risk, the ESCo asks the city for a greater percentage of the dollar savings

Proposed

1. The city decides to enter into a performance based contract.

2. The city publishes an RFQ for an ESCo to conduct energy auditing and engineering, financing, equipment installation, and training. Criteria for selection are qualifications and experience. The RFQ includes all of the known information about the buildings energy consumption and assumed energy conservation measures. This information is included so that the ESCos have something on which to base their proposals.

3. ESCos respond with proposals that are based on information provided in the city's RFQ. These proposals include proposed financing arrangements (e.g., shared savings or guaranteed savings) and their experience in performance based energy contracting.

4. Following selection of the firm, the city negotiates the contract at terms fair and reasonable to the city. These terms include length of the contract, percentage of savings accruing to each party, etc.

5. The ESCo conducts an energy audit. If the energy audit verifies the information contained in the RFQ and the ESCOs original proposal, they proceed to the next step. If not, the city and ESCo renegotiate terms of contract based on the energy audit. If they come to an agreement, they proceed to the next step. If an agreement cannot be negotiated, the city pays for the energy audit at cost and the relationship with the ESCo is terminated.

6. The ESCo conducts engineering and purchases and installs the equipment.

that will result from the equipment than the ESCo otherwise would have asked.

5. The ESCo conducts an energy audit. If the energy audit verifies the information contained in the RFQ and the ESCOs original proposal, they proceed to the next step. If not, the city and ESCo renegotiate terms of contract based on the energy audit. If they come to an agreement, they proceed to the next step. If an agreement cannot be negotiated, the city pays for the energy audit at cost and the relationship with the ESCo is terminated.

6. The ESCo conducts engineering and prepares bid specifications for the installation of equipment.

7. The city publishes a call for bids for the purchase and installation of the equipment as per bid specification.

8. The city awards the contract for the installation to the lowest responsible bidder. (If the municipality is a county, the low bidder is required to obtain a bid bond.) This contract is awarded to a firm other than the ESCo; since the ESCo is writing the bid specifications, it would be a conflict of interest for the ESCo to bid on them.

9. The ESCo manages the installation of the equipment.

10. The installing contractor is paid by means agreed to in the original negotiations between the ESCo and the city.

11. The ESCo assumes responsibility for the proper operation and maintenance of the equipment or training city personnel to do same.

12. Energy savings result; as per contract, the city and ESCo divide them.

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7. Energy savings result; as per contract, the city and ESCo divide them.

Conclusion

In the above example, the city has paid for the increased administrative costs and contract management due to the many additional steps required by existing statutes. It must also sort out legal responsibilities in the contract negotiations with the ESCo in the event the equipment does not perform satisfactorily. And, because of the additional risk that the ESCo is taking, it demands a higher rate of return on its investment than it might otherwise have done.

Senator **Evans**. Thank you very much.

Mr. Haas, on the kinds of no charge analyses that you're providing, you say that funding comes from Federal and State energy grants—from your written testimony—and some from the State's general fund as well.

Have you considered the kind of share-the-savings concept and the establishment of a revolving fund, that instead of no charge, that some small share of savings that accrue go into paying back the initial cost, and develop a revolving fund, and don't have to have a continued drain on funding from some other sources?

Mr. **Haas**. We have considered that, Senator, and we've looked at a couple different options for putting together a pool of resources to develop that fund. We believe that it would be necessary to start a fund like that with some significant capital contribution, as opposed to try to recoup a portion of the savings from each of the businesses and institutions that benefit from our services.

So that could be a way in the long run to set up a State fund.

We're looking now at, and have in the past talked with DOE about the possibility of changing regulations to allow some of the funds we are now provided to make capital equipment purchases which are not currently allowed under the State Energy Conservation Program funding.

Also, at the State level, we have considerable concern about solid waste disposal and are looking at a number of waste energy type facilities. In that process, our State legislature has provided some money to begin a revolving loan fund for that very purpose. To the extent that we can save energy dollars with that and move it back into converting waste energy, that will to some extent deal with the kind of projects that we might envision happening.

Senator **Evans**. But doesn't it make sense—it seems to me that especially as you're getting into system where performance contracting and share-the-savings kinds of things become more prevalent, that to the degree you're getting involved in providing the analysis and all of the information necessary to go out and do it, that you should share as well as the person who is investing in the actual equipment on the savings, and should be getting that back?

If 10 percent of the total cost of a share-the-savings is in the analysis and 90 percent is in the equipment and carrying it out, why shouldn't you get back 10 percent of the shared saving? It would seem to me that you build up—and the time to start building that fund up is not to wait until you have some major grant at the front end, but start yesterday, start building it up. The best way to get a good fund 5 years from now, start today.

Mr. **Haas**. I'll take your suggestion back to Michigan and talk with our program and other policy people to find out what they think.

Senator **Evans**. I guess you can guess where I'm leading. Every time I get interrupted here, it's to go over and vote on another cut in some kind of a Federal program. And I had the unhappy choice just a few minutes ago of going over and cutting $100 million out of veterans' health care. And you can guess where some of these programs are going to end up when we have to make some of those kind of tough choices.

So it seems to me that to the degree in arenas like that, where there is a clear saving or a clear benefit, without any up-front capital coming to someone who invests in a share-the-savings or performance contracting concept, that to the degree the State is involved, it would be a good idea to start sharing in the reward.

You mentioned the Time Energy example that you used, that the project will be paid off in 5 years from avoided energy costs. Do you know offhand what the contract with Time Energy calls for? Will they share in the savings for a 5-year period and is that the end of their contract, or does theirs continue for a longer period of time—or do you know offhand?

Mr. **Haas**. I'm not familiar with the detailed language of that contract, but my understanding of it that after approximately 5 or 7 years, Time Energy will no longer receive benefits. They will have recouped their investment plus a profit for the risks that they have undertaken, and that the savings from that time on will accrue to the school district and be able to be used to provide higher quality education.

Senator **Evans**. Do you have any idea from projects of this sort what knd of return is generally expected in an energy service company for their risk and for the investment?

Mr. **Haas**. I am not able to give you a particular figure. I would say that it depends on the relative risk that the energy services management company sees in the project. If the risk's higher, they'll look for a higher rate of return.

I think that the projects that I've been aware of, the return rates have been above other market return rates, but there does seem to be some interest in securing a premium for energy conservation projects which seem to be slightly more risky than other investments because of the uncertainty about energy prices.

Ms. **Burman**. If I could add, the energy services companies that have bid on our project were looking for between a 20- and 30-percent rate of return.

Senator **Evans**. Do you expect that that's likely to come down as more people get into the business?

Ms. **Burman**. I'm not sure. Probably you should ask the energy services industry.

Senator **Evans**. OK, I may have a chance to do that a little later. In fact, I guess we will get a chance to do that a little later.

What, Mr. Haas, have you run into with the energy service companies, in this growing concept of performance contracting and share-the-savings? Are there any one or two major warning flags or problems that have occurred in what otherwise seens to be a pretty good idea where everybody wins all the way around?

Mr. **Haas**. I'm not sure I would describe them as warning flags, but there have been a number of hurdles to jump over in the process. We have found that the local governments, institutions, or businesses that are involved are faced with a situation where they're provided information that says if you invest your own money and have a good very good rate of return or a very significant savings, and one hurdle to get over is whether they want to forego a substantial portion of that savings in the early years in order to have someone else put up the capital.

That's a tough decision for people to make because the Federal Government, I think, is a good example of that. The Federal Government, I believe, has a policy that says that they should not enter into contracts to do things that they could do cheaper themselves.

And in school districts that are faced with the same situation as government is that their budgets are tight or being cut, and though it would make more sense for them to do it themselves, they don't do it at all because they don't have the money. And I would say that's a hurdle that we sometimes have to jump over.

Senator EVANS. Turning to your electric energy planning which is now going on, or I guess just getting underway, how many Michigan utilities, what's the coverage of Michigan in terms of the number of utilities, and how many of them are publicly owned, how many of them are investor owned?

Mr. HAAS. We have 65 utilities in Michigan. The two largest investor-owned utilities provide about 90 percent of the electricity to the State. The other 55 electricities, divided up between small investor-owned utilities, municipal utilities, and rural electric co-ops.

Senator EVANS. Are essentially all of the utilities public, private, large, small, interested in or involved in this process?

Mr. HAAS. We have all the major utilities directly involved, and we have associations representing municipals, rural co-ops, and the small investor-owned utilities participating in the study. We have received financial support from all but a handful of those 65 utilities, as well as staff support.

Senator EVANS. What's the—perhaps this is too early to ask the question, but as you develop a plan, how will you carry it out with 65 separate utilities? You mentioned the difference between Michigan and the Northwest.

I'm sure each region of the country has its own problems and not many have the one advantage we have, which is coordinating capacity of the Bonneville Power Administration.

Have you given any thought yet to how any electric power plan that might be developed would actually get implemented?

Mr. HAAS. Yes, we have. This electricity option study that we're undertaking is one of a three-part approach that we began on a year ago.

The other two parts of the approach speak to the implementation portion. The first leg of the three-legged stool would be to enact legislation that requires utility companies to submit to the Public Utilities Commission in Michigan an electric resource plan every 2 years. This plan would require them to take a look at all of the supply and demand side options and to come up with a strategy for implementing the various options over the next several years.

This plan would then be reviewed and either concurred on or not concurred on by the Public Utilities Commission in order to give the utilities a signal as to how they should proceed. That would be one way to move toward implementation for the actions that utilities themselves can undertake.

Senator EVANS. The clout from the Public Service Commission being the ultimate decision on rate cases.

Mr. HAAS. Exactly.

In addition to that, we believe that when we're finished with our study, we will find that some of the things that seem to make sense for society to do are not being done. And in order to allow strategies to be implemented, to let customers and utilities pick options that seem to make sense to us, we would work through our legislative and executive branches and through the Federal Government if need be, to try and remove barriers to cost-effective strategies or to provide incentives or modify incentives to encourage businesses and residential customers as well as utilities to move toward implementing those options.

Senator **Evans**. Ms. Burman, you mentioned on page 4 of your testimony, most building owners are initially skeptical of the energy service company concept. What is the nature of the skepticism? Is this too good to be true?

Ms. **Burman**. Well, it's a process that people seem to go through. I first went and talked to about 35 jurisdictions around the State before we ended up with the 3 that I mentioned. The first reaction is, oh, that's too good to be true. Are you sure they're doing this?

The second reaction is, oh, someone told me that they had read something about it, and weren't there some tax abuses? And so then their skepticism changes from too good to be true to are you sure this is something that we want to get involved with in terms of credibility?

Then people, once you start talking about what kind of firms are now in this business and some of them are local affiliated with utilities, and people recognize their name and their standing in the community—then they say, well, this is really something we would like to look at; let's look at our opportunities here.

So then when you start looking at—take down that energy audit from the bookshelf, dust it off and start looking at what some of the paybacks are, and people see then that, oh, these are the paybacks—they're willing to put their money into it. And they can then see what the rate of return is, as well as how much money these people are actually going to be making.

Then their reaction goes to, oh, maybe we should be paying for this ourselves. So it's sort of a cycle that people go through. And then they have discussions, whether it be in the city council chambers or at the executive table, about this opportunity. And usually then it comes down to, well, I guess we really wouldn't pay for it ourselves. We need new police cars or new school desks or new teachers, whatever.

And so then what I've seen is either a decision to do nothing, in one case to self-finance, and then in a couple of other cases to go this route.

Senator **Evans**. OK. You mentioned also—I can't help but comment on the rather odd concern of agencies that, if they engage in energy efficiency and reduce their energy costs, that somehow their budget the next year will be reduced.

It doesn't seem to me—if I ever found somebody who acted on that basis, they wouldn't be around very long. That's deliberately acting contrary to public good and the agency's good. If that's prevalent, something is wrong, but I can understand the nature of that.

Mr. **Haas**. We saw that same problem in State government in Michigan. And one of the things that we did was to try and provide an incentive system to State government departments to encourage them.

Senator **Evans**. Like keeping your job?

Mr. **Haas**. Well, that wasn't the one we used, actually. The one that we used was, we enacted legislation in 1982 that would allow State departments who were responsible for their own heating or utility budgets, if they undertook various measures that would save energy and therefore not expend all of the funds in their utility budget, 75 percent of the money that was saved could be carried over to the next year, which that department could then decide to use for more energy conservation measures.

And as a number of the energy conservation measures are not only energy saving, but also enhance the comfort of the people who work there, we've had a relatively successful program over the last 3 years. Millions of dollars have been refunneled.

Senator **Evans**. But you confine that, then, to carrying it over for further investment in energy savings operations?

Mr. **Haas**. Yes.

Senator **Evans**. Is that a multiple year carryover? Do you carry it over from year to the next, and thus that enables you to save even more the second year? You can carry over 75 percent of that savings to the next year in order to do more of the same?

Mr. **Haas**. Yes. That law was passed in 1982 and is scheduled to allow that kind of carryover until 1987. Michigan would typically sunset legislation so that it will be required to be reviewed, decide whether to extend it. We're in the process in the last 2 weeks, in fact, in working with both the House and Senate to draft legislation to extend that indefinitely.

So it has been successful.

Ms. **Burman**. Those are the kind of incentives we're looking at, as well as potentially a facility or a building being able to use the money not just for energy conservation opportunities, but potentially deferred maintenance.

Senator **Evans**. I guess if I were still Governor, I might go for those two. I still think promotion for those who do a good job is not a bad incentive.

Ms. **Burman**. We have formed something that we've named the Governor's Energy Team, to work with the State agencies to help them see the wisdom of some of the opportunities that we're bringing forward.

Senator **Evans**. Do I understand correctly, Ms. Burman, that you said that you're building 14 energy-efficient buildings in cooperation with Bonneville or with funding from Bonneville, this goal of 30 percent greater efficiency, but you would pay all design costs and all construction of those 14 buildings?

Ms. **Burman**. No. Only the design and construction costs for the energy-efficient portion of the building.

Senator **Evans**. I see. Then you would monitor consumption. Does the benefit of those energy-saving measures then accrue to the owner?

Ms. **Burman**. Right.

Senator Evans. And are these all public agency owners, or are they some private?

Ms. Burman. It could be an energy-efficient Nordstrums or Hyatt Regency of an office building.

Senator Evans. And is the concept really that you figure that whatever benefits accrue to that owner come because they're going to have to go through some inconvenience of whatever it takes to do the monitoring and testing?

Ms. Burman. Right.

Senator Evans. How far along are you on that project? Are any of them actually underway yet?

Ms. Burman. No. We will be kicking off the recruitment of the building owners, we believe, in January.

Senator Evans. I'm sure we would be interested in following and getting some reports on that.

Ms. Burman. We would be very pleased to forward them.

Senator Evans. OK. Thank you very much. It's been very helpful.

And we will now move to Panel No. 3: Mr. Richard Pool, director of Kaiser Aluminum Chemical Corp.; Mr. Loren Hov, director of Energy Management, Stauffer Chemical; and Dr. Mark Ross from the Physics Department of the University of Michigan.

It's good to have you here, gentlemen, and let's start with Mr. Pool.

STATEMENT OF RICHARD B. POOL, DIRECTOR, ENERGY AND REGULATORY AFFAIRS, KAISER ALUMINUM & CHEMICAL CORP.

Mr. Pool. Thank you, Senator.

My name is Richard Pool. I am director of energy and regulatory affairs with Kaiser Aluminum & Chemical Corp. headquartered in Oakland, CA. We're pleased to have the opportunity to offer the committee our comments on industrial energy conservation.

I will first describe the progress we have made in conservation and then discuss some problems and some recommendations we have for Federal Government action.

In 1974, the aluminum industry started its formal energy conservation program with a voluntary commitment to the Department of Commerce and the Federal Energy Administration on a 10-percent improvement in energy efficiency through 1980. We used 1972 as the base year for measurement in that program.

In 1979, we upped that goal by another 10 percent for a total of 20-percent improvement in energy efficiency through 1985 and we are pleased to say that with the exception of one small recession year in 1975, we have achieved or exceeded our goal throughout that period of time, achieved a 1985 goal at the end of last year with a cumulative 21.3-percent savings.

With respect to energy-savings potential in aluminum, in the late 1970's, the industry completed a study of its long-range energy conservation potential. The study analyzed savings using two criteria. The first was the installation of the best available technology, process technology at that time, and the second then assumed if we could pull some of the technology work from our R&D labs and assume that would be successful and we could install it, how much energy would we be able to save.

The first phase of that study showed a 20-percent potential for energy savings from where we were, and a second step showed a total of 40-percent savings. So the conclusion then, and I believe the conclusion now, is that we remain with a substantial degree of energy savings left to our industry.

International changes in energy costs that have occurred since the 1970's have caused major changes within the aluminum industry and its structure within this country. In our industry, energy costs are the largest single variable element in the cost of producing aluminum. Any shifts in energy costs create major production shifts within the industry and there have been a number of changes in energy costs within the United States and outside the United States.

Consequently, there has been a major shift in aluminum production to offshore plants within recent years.

The balance of trade in aluminum products between 1980 and the present had shifted unfavorably by nearly $2 billion per year. Between 1980 and 1984, U.S. imports of primary aluminum rose from 527,000 tons to 882,000 tons, an increase of 67 percent. Simultaneously, exports of primary aluminum dropped from 649,000 tons to 260,000 tons, a decrease of 60 percent.

These changes have been primarily driven by energy cost factors in the industry.

Kaiser has some policy recommendations, and we feel it is certainly in the best interests of the country to establish energy price and conservation policies which will help to retain basic U.S. industries like aluminum. We support three Federal energy conservation policy actions. First of all, the Government should eliminate cross-class subsidies in the marketing of its Federal power, and it should set rates based upon the cost of service. This will let us be competitive.

Second, the Government should implement a least-cost energy planning power in its Federal power marketing agencies. This should focus on purchasing industrial energy conservation when it represents the lowest cost source.

And the third, we strongly believe the Government should ensure that its own facilities implement aggressive energy conservation; in other words, the Government should set a good example for the rest of the country in its own facility.

We believe there are still large amounts of cost-effective industrial conservation available, certainly in the Bonneville Power region of the Northwest and across U.S. industry elsewhere.

For a cost equal to or below the cost of other conservation investments such as residential weatherization programs, in the Northewest for example, 300 to 400 megawatts of energy could be obtained by Bonneville from the aluminum industry.

This kind of acquisition is of superior quality because it's more reliable compared to other conservation programs. By the nature of industrial electrical contracts, amounts of conservation can be guaranteed to the utility and the duration of the acquisition can be specified. The buyer in the Northwest, Bonneville, can be absolutely certain of its purchase.

From the industrial customer's point of view, incentives to increase efficiencies or modernize plants can be just the thing that makes the difference in terms of remaining competitive. Proper energy policies, in other words, acquiring industrial conservation on a cost-effective basis, can be a partial answer to retaining industries, preserving jobs, and the economic benefits they provide.

We at Kaiser believe that U.S. energy policies are well-served if Bonneville and other Government power marketing agencies allocate appropriate funds toward the acquisition of industrial conservation.

I'll be happy to answer questions in turn.

[The prepared statement of Mr. Pool follows:]

Testimony of Richard B. Pool
Director of Energy & Regulatory Affairs
Kaiser Aluminum & Chemical Corporation

Before the U.S. Senate Committee on
Energy and Natural Resources

October 18, 1985

My name is Richard B. Pool and I am Director of Energy & Regulatory Affairs for Kaiser Aluminum & Chemical Corporation.

We are pleased to have the opportunity to offer the committee our comments on industrial energy conservation since the aluminum industry has been one of the industrial leaders in implementing energy conservation. We also have a number of energy problems we believe are of national concern.

I will first describe the progress we have made in conservation and then discuss the problems and those areas of potential future energy savings. I will conclude with an example from our operations in the Pacific Northwest and some recommendations for policy action.

Conservation Progress in the Aluminum Industry

In 1984 the U.S. aluminum industry consumed 797 trillion Btu's of energy. This is almost 3 percent of the total industrial consumption in the country. Nearly three quarters of this consumption was in the form of electricity used in the electrolytic aluminum reduction process.

The U.S. aluminum industry consists of 32 primary aluminum reduction plants and approximately 600 plants that produce semi-fabricated products. In addition, there are are now approximately 75 secondary ingot plants that recycle aluminum. The industry's plants are located in virtually every state. At capacity, approximately 150,000 people are engaged in making, selling or distributing aluminum in the U.S. Another 300,000 people are dependent upon those jobs, making a total of 450,000 people linked to the domestic aluminum industry.

In 1974 the aluminum industry voluntarily committed to the Department of Commerce and the Federal Energy Administration a 10 percent improvement in energy efficiency through 1980, with 1972 as the base year. With the exception of the recession year of 1975, the industry did better than its goal every year. In 1979 the industry committed to the Department of Energy a 20 percent improvement in energy efficiency through 1985, again compared to 1972. Through the second half of 1984 the goal was again bettered with a savings of 21.3 percent.

The relative ease by which aluminum can be recycled makes recycling one of the most attractive and effective ways to save energy in the aluminum process. Aluminum can be recycled for about 5 percent of the energy that is required to produce virgin metal. The energy saved from recycling cans in 1982 was equivalent to over 700 million gallons of gasoline.

Recycling of scrap aluminum beverage cans has increased dramatically from a rate of 15.4 percent of cans sold in 1972 to a rate of 52.8 percent in 1984. The attractive value of recycled aluminum makes it economically appealing to accumulate aluminum cans and return them to recycling centers for money. Over $250 million was paid out for such cans in 1984. The success in recycling aluminum cans is due entirely to private initiative being stimulated by the profit incentive.

The aluminum energy conservation achievements to date have resulted from a combination of capital investments, management initiative and technology developments. We in the industry are proud of our accomplishments, but the rate of conservation progress has been restrained in many ways because of the huge investments needed.

In the late 1970's the industry completed a study of its long-range energy conservation potential. The study analyzed energy savings using two criteria. The first was installation of the best available technology existing at that time and the second assumed additional breakthroughs in process technology. The study showed 20 percent energy savings potential in step one and 40 percent in step two.

These are highly attractive figures. The industry is working hard on technologies and investments to achieve them. The major barrier is capital funds. The energy intensive areas of the aluminum process are also highly capital intensive. At the time of the study, it was determined that installation of best available technology would require expenditures equalling 140 percent of the industry's existing capitalization. With the industry's existing heavy debt load, expenditures of this magnitude cannot be undertaken. Most of the engineering work now underway at Kaiser and the other aluminum companies is aimed at finding low-cost technological breakthroughs that can achieve significant savings without heavy capital requirements.

The smelting process is the most capital and energy intensive part of aluminum processing. Each smelter was built using the best energy conservation technology available at the time of construction. This technology has steadily reduced the amount of electricity needed to produce a pound of metal from a pre-World War II average of 12 kWh to a current level of about 6 kWh. Once a plant is built however, there is limited potential for improved efficiency without complete reconstruction. The industry currently operates at an average of about 7.5 kWh per pound.

Current Aluminum Industry Operating Environment

International changes in energy costs that have occurred since the early 1970's caused major changes within the aluminum industry. Since energy costs are the largest, single variable element in the cost of producing aluminum, any shifts in this cost create major production shifts within the industry. There has been a major shift in aluminum production to offshore plants in recent years. The U.S. share of Free World primary aluminum capacity has declined and is forecast to continue to decline from 45 percent in 1970 to 26 percent by 1990. The share of Free World primary aluminum capacity accounted for by non- traditional supplying countries has been increasing and is forecast to continue to increase. These include:

South America, from 2 percent in 1970 to 11 percent in 1990;

Africa, from 2 percent in 1970 to 5 percent in 1990; and

Oceania, from 2 percent in 1970 to 10 percent in 1990.

New producers in the Middle East and Asia now account for 4 percent of total capacity.

Government ownership or control of Free World primary aluminum capacity has substantially increased from less than 10 percent in 1960 to 40 percent today. Eleven of the leading twenty-five owners of primary aluminum capacity are governments. Government ownership of primary aluminum capacity increases the likelihood that an increasing percentage of Free World primary aluminum capacity will continue to operate despite economic considerations which may dictate reduced output or closure to privately-owned companies.

As a result, the U.S. balance of trade in aluminum products between 1980 and the present has shifted unfavorably by nearly $2 billion per year. Between 1980 and 1984 total U.S. imports of primary aluminum rose from 527,000 tons to 882,000 tons...an increase of 67 percent. Simultaneously, exports of primary aluminum dropped from 649,000 tons to 260,000 tons...a decrease of 60 percent.

Total U.S. imports of semi-fabricated products increased from 76,000 tons in 1980 to 494,000 tons in 1984, an increase of over 500 percent. U.S. exports of these products fell from 346,000 tons to 219,000 tons, or 37 percent, during the same period.

Energy costs are the predominant reason behind the shifts in primary aluminum and, along with the high value of the dollar, contribute to shifts in semi-fabricated trade. In Kaiser's analysis there are three root causes of these changes:

1. the natural energy cost advantages inherent in certain energy-rich countries such as Venezuela, Brazil and the Middle Eastern countries;

2. energy cost subsidies furnished to industry by some foreign countries; and

3. misdirected U.S. energy policies which require industrial consumers like the aluminum industry to pay the highest electricity rates.

The aluminum industry can deal with the first item if it can obtain Government cooperation on numbers two and three.

With respect to foreign subsidies, Congress and the Administration need to get tough in trade policies with those countries that are subsidizing their aluminum producers and denying access to U.S. companies. We are pleased that the U.S. Commerce Department is conducting a major study to uncover these practices in the semi-fabricated sector of the industry.

Item three on the list needs a serious policy review. The dramatic increases in electric utility costs in this country have placed tremendous political pressures on federal and state utility regulators. In an effort to minimize the cost burdens on utility stockholders and homeowners, the answer has frequently been to shift more of the burden to industry. In the case of aluminum and many other industries, this policy is short-sighted in the long run because costs become non-competitive.

Many U.S. aluminum smelters are now "swing capacity" in the international market because U.S. industrial electricity rates are considerably above the Free World rates.

For example, one-third of the nation's aluminum smelting capacity is located in the Pacific Northwest and receives electricity from the Federal Bonneville Power Administration. At full production, the Northwest aluminum industry directly employs 12,000 people and indirectly supports 30,000 jobs in the region. Due to plant closures and curtailments, the industry's direct employment level is now approximately 10,000. The industry currently provides $1.5 billion annually to the economy of this region.

In the last five years, BPA raised the electric rates to the Northwest aluminum industry by 800 percent and that rate is now 50 percent higher than the Free World average electric rate to aluminum smelters. The Northwest smelters have gone from among the most cost competitive in the world to, at best, "swing" capacity. "Swing" capacity operates only in periods of high demand and strong prices. Following the 800 percent rise in electric rates, one aluminum company, Martin-Marietta, closed one smelter and sold its second to a foreign-owned company at a large writedown. Another company, ARCO, sold its Northwest smelter.

In 1984 the U.S. Department of Commerce completed a study of the U.S. aluminum industry and concluded that power rates to the U.S. aluminum companies are among the highest in the world.

Policy Recommendations

Kaiser believes it is in the best interest of the country to establish energy price and conservation policies which will help to retain basic U.S. industries like aluminum . Many of the policies which affect aluminum are directly within the control of the Federal Government because the Government is one of the industry's largest energy suppliers.

Kaiser supports three Federal energy conservation policy actions.

1. The Government should eliminate cross-class subsidies in marketing of Federal power and should set rates based on the cost of service.
2. The Government should implement a least-cost energy planning policy in its Federal Power Marketing Agencies. This should focus on purchasing industrial conservation when it represents the lowest cost source.
3. The Government should ensure that its own facilities implement aggressive energy conservation.

These actions would have the benefit of improving the operations of the Federal power facilities and setting an example for state-regulated or publicly-owned utilities. I would like to elaborate on the second item by discussing an example in the Pacific Northwest.

The Northwest Power Planning & Conservation Act was passed in 1980 to create a framework for electricity planning in the Northwest. The cornerstone of the Act is conservation. In 1980, as indeed today, conservation was thought to be the most cost-effective resource in terms of providing electricity for future load growth.

Since that time, the Bonneville Power Administration has embarked on a massive conservation program aimed at acquiring resources across all sectors -- residential, commercial, industrial and others. To date, Bonneville has spent over $400 million in acquiring conservation and developing programs which will provide future savings.

Bonneville examined the conservation potential in various sectors in 1980 and determined that residential weatherization held the most promise for massive savings. This includes retrofit programs for existing homes and model conservation standards for new home construction. Conservation in the other sectors was thought to be smaller in overall potential and would require shorter lead times to acquire. As a result, Bonneville concentrated on weatherization programs and has done relatively little in the commercial and industrial sectors. In fact, about 90 to 95 percent of Bonneville's conservation budget is in one way or another targeted toward the residential sector.

In the late seventies and early eighties, the Northwest was perceived to have an impending energy deficit so that new resources had to be acquired very quickly. The region was constructing five nuclear plants and investing heavily in conservation. Since that time, the situation has been reversed for a number of reasons and the region now faces a fairly long-term period of energy surplus. One of the nuclear plants was completed, two were cancelled and two others were mothballed indefinitely.

Because of the anticipated long-term surplus, Bonneville is revamping its conservation planning and has begun to scale back programs. It is concentrating on pilot programs to develop the capacity to deliver conservation when it is needed. Bonneville spends in the range of $60 to $70 million per year on these programs and it remains to be seen how this spending will evolve in the future.

Although there is some question as to the appropriate pace of the residential weatherization program, there is no question that it is more cost-effective than acquiring new generating facilities. The Regional Act suggests that conservation must be cost-effective. This means it must cost less than building a new nuclear or coal plant. In fact, the general guideline on cost-effectiveness is based on the cost of building and operating a new coal plant. In 1985 dollar terms, the cost is estimated at about 55 mills per kilowatthour. Weatherization programs, on the other hand, actually cost Bonneville in the range of 30 mills or about 60 percent of the cost of the alternative. While there is also some question about the quality of savings and the duration, there is every reason to believe that this kind of conservation is a prudent investment.

Bonneville is now considering its role in industrial conservation. Historically, it has had a restricted spending program for industrial customers, but the funding was limited and the participation low. As a result of Bonneville's Direct Service Industries Options Study, it is considering establishing a significant Conservation-Modernization Program for Pacific Northwest industries. The program will start by acquiring conservation savings from the aluminum smelters; after that it will be extended to other industry. Kaiser believes that this kind of program is an appropriate action on Bonneville's part.

When Bonneville acquires conservation from the industrial sector, two things happen: cost-effective resources are obtained and the relative competitive position of the participating companies is improved. Bonneville can achieve its conservation goals easily and, at the same time, assist industries that are hard hit in today's economic environment.

We believe there are large amounts of cost-effective industrial conservation available in the Northwest and elsewhere. For a cost equal to or below the cost of residential weatherization programs, 300-400 megawatts of energy could be obtained by Bonneville. This kind of acquisition is of a superior quality (more reliable) compared to other conservation programs. By the nature of industrial electrical contracts, amounts of conservation can be guaranteed and the duration of the acquisition can be specified. The buyer, Bonneville, can be absolutely certain of its purchase.

As an example of the kind of projects that are available, consider the proposal that Kaiser made to Bonneville. Kaiser owns and operates three large facilities in the State of Washington, two are aluminum smelters. Kaiser has the right to receive a maximum of 737 megawatts from Bonneville. We could proceed with conservation projects at our two aluminum smelters if we were offered the right price. Through extensive modifications to the reduction cells, excess heat losses can be eliminated and the specific unit consumption of electricity can be decreased. In effect, we would "weatherize" the reduction cells. As a result of this modification, Kaiser would reduce its power take by 170 megawatts. The power returned to Bonneville would be released according to an agreed-to schedule.

From the industrial customers' point of view, incentives to increase efficiencies or modernize plants can be just the thing that makes a difference in terms of remaining competitive. Proper energy policies, i.e. acquiring industrial conservation on a cost-effective basis, can be a partial answer to retaining industries and preserving jobs and the economic benefits they provide. We at Kaiser Aluminum believe that U.S. energy policies are well served if Bonneville and other Government power marketing agencies allocate appropriate funds toward the acquisition of industrial conservation.

Again, thank you for the opportunity to share our views.

Senator EVANS. Thank you very much, Mr. Pool.
Mr. Hov.

STATEMENT OF LOREN J. HOV, DIRECTOR, ENERGY MANAGEMENT, STAUFFER CHEMICAL CO., ON BEHALF OF THE NATIONAL ASSOCIATION OF MANUFACTURES

Mr. Hov. Thank you, Mr. Chairman. I am Loren J. Hov, director of energy management for Stauffer Chemical Co., now a wholly owned subsidiary of Cheseborough-Pond's, and I'm speaking on behalf of the National Association of Manufacturers.

My prefiled testimony, only summarized here, discusses some of the country's and industry's background in energy use and conservation. Industry has led the Nation in energy efficiency improvement and indeed industry can and will do more.

I point out a multiplicity of specific ways industry has improved and can improve energy and resource efficiency, at least 15 different techniques in the filed testimony, but I will be pleased to discuss more about these ways if you wish.

Of all these ways, few are truly innovative or involve new technology. There are somewhat innovative applications of new materials to old concepts, as well as innovation in applying old policies and technologies for resource conservation.

Perhaps my definition of innovation is more restrictive than most. I've spent much time in R&D and have inventions in a variety of fields, but I look at it perhaps differently than the normal.

The conceptualizing of these techniques and their installation and/or use is motivated by proper price signals and a strong desire and need by industry to reduce costs. Increasing foreign competition to many of our members makes cost reductions critical to continued existence. The various ways I suggest that Government can lead and contribute to more industrial energy and resource efficiency can be divided into two types of actions.

The first is to undo some things such as:

First, reexamine Government conservation programs to eliminate unnecessary and unworkable ones.

Second, eliminate some counterproductive industrial data collection programs.

Third, eliminate performance standards for industrial buildings and mandatory requirements for industrial motors, pumps, et cetera.

Fourth, decontrol the wellhead price of all natural gas.

Fifth, repeal incremental pricing of natural gas to industry under the NGPA and remove demand constraints of the Fuel Use Act.

At a full hearing this spring at FERC, I asked the then five Commissioners to put a moratorium on incremental pricing and their first response really appeared to be they thought they had already done it. It's still out there. It's still hurting industry.

The other type of the two is to do things such as:

First, promote a good overall investment climate in the economy.

Second, help maintain a free energy market and keep the windfall profits tax off of natural gas.

Third, promote energy education, technology transfer, limited and voluntary data collection, and support for long-term high-risk R&D.

Fourth, support nondiscriminatory contract carriage of gas and ensure equal access to suppliers from all sources.

Fifth, promote coal slurry pipelines.

Sixth, promote nondiscriminatory cost-based pricing, including time of use rates and promote welfare and income maintenance programs outside of utility rates.

Incidentally, in commenting on other earlier comments, I have been a commenter to ASHRAE on ASHRAE standards, including 90.1 just recently, the new nonresidential buildings, and 100.4; that is, old facilities or buildings, and would be happy to respond to anything there.

I think the Senator made some comments earlier on the impression of less than a 1-year payback in the Federal buildings area, and I would like to suggest that this doesn't necessarily—the convenient conclusion isn't necessarily the one that industry always reaches.

I'll be happy to respond to any questions.

[The prepared statement of Mr. Hov follows:]

TESTIMONY OF

LOREN J. HOV

ON BEHALF OF

THE NATIONAL ASSOCIATION OF MANUFACTURERS

BEFORE THE

SENATE ENERGY AND NATURAL RESOURCES COMMITTEE

SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION

ON INNOVATIVE APPROACHES TO INDUSTRIAL ENERGY EFFICIENCY

OCTOBER 18 1985

Mr. Chairman, Members of the Committee, I am Loren J. Hov, Director of

Energy Management of Stauffer Chemical Company, now a wholly owned subsidiary of Chesebrough-Pond's Inc., and a member of the Energy Committee of the National Association of Manufacturers (NAM). I am accompanied by Jana Oakley, Director of Energy for NAM.

My testimony is presented to you today on behalf of NAM, a voluntary business association of more than 13,000 corporations, large and small, located in every state. NAM membership ranges in size from very large to over 9,000 smaller manufacturing firms, each with an employee base of less than 500. NAM member companies employ 85 percent of all workers in manufacturing and produce over 80 percent of the nation's goods. NAM is affiliated with an additional 158,000 businesses through its Associations Council and the National Industrial Council.

I would like to commend this subcommittee for holding a hearing on innovative approaches to industrial energy efficiency and conservation. This is an area of deep interest to NAM members and we, therefore, appreciate this opportunity to testify.

During the early 1970s, the United States experienced great energy vulnerability due to the Arab oil embargo. While conditions have somewhat changed and we are enjoying an adequate supply of energy, our energy problem, to a certain degree, is still with us. We, therefore, need to continue to be energy conscious and energy conserving. More broadly, we need to be resource conscious and resource conserving.

To meet our energy needs, we should continue to seek expeditious development of our domestic natural resources. Also, a fully-developed energy conservation program can help us to become energy secure. Many opportunities for cost-effective conservation still exist. Continued voluntary conservation of energy in all consuming segments is essential and should be constantly improved.

In the past ten years, the leading force for energy conservation in the United States has been private industry. The industrial sector has led all other sectors of the economy in improving the efficiency of energy use.

According to the U.S. Department of Energy, since 1972. the cumulative energy efficiency improvement reported by the industrial sector through 1983 was around 26%. As energy efficiency in the 1980s increased, energy consumption has decreased. Total reported energy consumption in 1983 for the 20 Standard Industrial Classifications (SIC) encompassed in the Department of Energy Annual Report on Industrial Energy Efficiency Improvement in 1983 submitted in April of this year was 11.1 quadrillion Btu. This level of energy use was over 20% less than the reported consumption level in 1980. As the price of energy rises, industry finds ways to use less energy and/or less costly energy, and to use energy more efficiently. Cost-driven market forces should continue to be the main stimulus for conservation and efficient energy utilization.

The record is demonstrative of the great savings industry has experienced through resource conservation; however, adjustments in industry still must be made in order to obtain even greater resource or energy efficiency. Many industries are answering this call by developing and implementing energy management programs. Internal energy audits are conducted to assess energy use and waste. Comprehensive surveys are conducted on structures, systems, equipment, processes and practices at industrial facilities and recommendations are made and implemented when economically and technically feasible. Energy efficient operations continue through process improvements, retrofitting of additional facilities, improved conservation practices and new construction incorporating new state of the art technology.

More specific techniques used by industry for resource or energy efficiency include the following:

(a) Heat recovery from process exhaust systems by using various types of heat exchangers including condensing exchanger.

(b) Re-use of previously exhausted air from process by use of various filtration methods.

(c) Optimizing the amount of air necessary to heat and cool buildings by using a combination of variable volume control, static pressure sensors and energy management systems.

(d) Increasing the efficiency of steam boilers by controlling the oxygen or carbon monoxide content of the exhaust gases, better fuel atomisation, exhaust gas heat recovery including condensing exchangers, etc.

(e) Decreasing electrical consumption by using hi-efficiency motors, more efficient light sources, automatic shut-down of process and building lighting systems, variable speed motors for fans, pumps, etc.

(f) Installation of dual or treble fuel firing capability for process or boiler use to burn the most cost effective and/or available fuel.

(g) Making piping changes and/or installing new pipe lines and meters in order to qualify for some exception or exemption to incremental pricing under the NGPA in order to save (dollar) resources.

(h) Optimizing refrigeration systems by specifying more tube surface, decreasing cooling tower condensing temperatures, improving heat transfer by use of automatic brush cleaners and reducing electrical consumption by use of variable speed chilled water pumps.

(i) Utilization of waste from process operation (liquid, vapor and solid) through solvent recovery, thermal combustion of vapors and incineration of liquids and solids in boilers with heat recovery.

(j) Installation of facilities to use lower cost and/or indigenous fuels such as coal as well as using new technologies such as fluidized bed combustion.

(k) Combination of several of the above with old-yet, new-technologies such as pebble bed regenerators and elaboration on other techniques.

In answer to the rising cost of electricity, many industrial facilities are installing cogeneration facilities to produce electricity and steam. A number of municipalities and industries, such as the forest products industry, are generating energy through incineration of their wastes. Improved thermal efficiency through industry cogeneration is a viable option to utility services. This, however requires a great deal of total capital investment which many smaller industrial facilities cannot afford.

One solution to the capital investment problem for cogeneration or other energy and cost conservation projects is being provided through energy service companies (ESCos). These companies provide "performance contracting" which is simply an agreement between a business and a contractor to improve the energy efficiency of a facility. The contractor or independent investor bears the entire initial cost of making the improvements and assumes the risk. There are various contracts which can be made. However, usually the agreement is that the energy service company only gains financially when energy savings occur for the business. There are advantages and disadvantages to this service and many industries seek other alternative conservation programs.

Several weeks ago I attended a meeting held by the Industrial Energy Group which is an ad hoc group of a wide variety of industrial companies that are large consumers of energy. I asked for a straw vote on how the energy managers viewed their companies' treatment of energy (dollar) conservation projects vs. other capital projects. Twenty three felt they were treated about the same in priority, one said it was easier to get capital for an energy project and six responded that it was harder. I was then told that I hadn't asked all the necessary questions since six said they hadn't responded yet as they could get no capital for any project. Perhaps the ESCos will help here.

Modification of boiler operations for "resource" efficiency is another technique used by industry. A midwest plant has three coal-fired boilers and a gas-fired boiler used for steam control. Varying amounts of steam use are compensated by pressure control to fire boilers more or less to respond to the pressure change. Coal boilers respond very slowly to fuel changes and these were used as "base load" boilers while the pressure swings were taken by the fast responding gas-fired boilers - even though coal costs less than half gas cost per pound of steam.

The plant changed its operation and, with a new phone system, plant operators notified the boiler room in advance of a steam use change. New pressure controlled steam vents were installed and the gas fired boiler was shut down. Swings in pressure were taken by somewhat over firing the coal system and blowing steam to the atmosphere - often many thousand pounds per hour. The result was poor energy (Btu) conservation but excellent resources (dollar) efficiency.

Upon examination, the above techniques show little if anything of real innovative or new technology. They do show innovative applications of new materials to old concepts and innovative applications of old technologies and practices in order to conserve resources.

The common thread of price signals and reducing costs as a motivator is woven through every example. Also, given the motivator, industry will find a way to reduce energy costs - which usually means reduced energy use and all the benefits that ensue.

The federal government can play an important role in ensuring industrial energy and resource efficiency. Continued industrial energy conservation requires heavy capital investment. This investment can be accelerated through incentives consistent with normal market forces such as the investment tax credit. The most efficient way to encourage industrial energy conservation investment is to promote a good overall investment climate in the economy. Industry, in response to market forces and investment climate, will make the most cost-effective and appropriate conservation investments. Energy conservation investments have been made and will continue to be made when they are economically feasible.

A free energy market is our best guarantee of a secure energy future. Given the need for reduced federal spending, many governmental conservation programs now in place are either unnecessary, unworkable or unaffordable. However, NAM believes the federal government has a role to play in conservation, such as education, technology transfer, limited and voluntary data collection, and financial support for long-term, high-risk research and development. With the voluntary help of various trade associations, government can develop a data base on industrial energy use and efficiency, publicize industry's favorable impact on our national trade balance through energy conservation, and report on progress.

Currently, NAM is working with the U.S. Department of Energy to develop and promote an energy manual targeted for small and medium-sized industrial firms to aid in further improving overall industrial energy conservation. The basic goal of this project is to make available materials that would assist plant managers, using their own capital resources, to implement the least cost-highest benefit solutions to industrial plant energy problems.

The NAM opposes mandatory data collection programs for the purposes of monitoring efficiency improvement progress or establishing data banes in particular areas of industrial energy consumption. Industry's objections are many, including proprietary and confidentiality reasons. We strongly recommend that the Energy Information Administrations broad authority for the mandatory collection of industrial energy consumption data be rescinded. Energy efficiency improvements are made in response to signals given in the free market, not to mandatory data collection schemes.

The imposition of mandatory conservation standards for industrial buildings and equipment is unnecessary, primarily because they cannot recognize the diversity of industrial processes. NAM encourages total elimination of government programs to develop performance standards for new and existing industrial buildings and or mandatory requirements to promote the energy efficiency of industrial motors and pumps and other industrial equipment.

NAM strongly supports comprehensive reform of natural gas policy and supports the following principles as a means of overall improvement of industrial energy efficiency:

o Price decontrol. Total decontrol of the wellhead price of all natural gas in an orderly manner;

- o Contract carriage. Establishment of nondiscriminatory mandatory contract carriage for natural gas based upon presumed pipeline capacity consisting of the reasonably foreseeable needs of present customers

- o Equal access. Insure that all buyers have equal access to all supplies of natural gas

- o Demand constraints. Repeal of incremental pricing and removal of mandatory demand constraints within the Powerplant and Industrial Fuel Use Act which limit flexibility;

- o Excise tax. NAM opposes an excise 'windfall profits' tax on natural gas which would reduce the positive effects of decontrol.

- o Pubic lands. Make available for development in an orderly and reasonable manner.

NAM believes that the price and availability of transportation are major deterents to the use of coal. The development of coal slurry pipelines would enhance competition in the coal transportation market and will allow industry alternate choices for greater efficiency and utilization of indigenous fuels. Legislation providing federal eminent domain authority to coal pipelines is necessary to remove obstacles which exist to pipeline construction.

Electricity rates should be cost based and send realistic price signals to consumers in order that cost based conservation measures may be taken. Each customer should be charged in accordance with the costs of serving that customer, and no customer or class of customers should pay prices which are disproportionate in relation to the costs they impose upon the system. The traditional declining block rate structure is based on this princple. It recognizes that fixed costs decrease per unit of supply to a given consuming point, and that large users can be served with a relatively smaller investment and lower operating costs. Within the constraints of other regulatory objectives such as metering costs and administrative simplicity, rates should also be designed to reflect cost differentials that arise from differences in time of use, both daily and seasonally. Pricing systems based on marginal cost theory require subjective judgements about future costs and divert attention from real cost factors. They serve only to confuse and prolong rate proceedings. Electricity rates which are not cost based, such as lifeline rates which subsidize residential users, encourage rather than discourage energy use. Necessary relief for low income groups should be handled through welfare or income maintenance programs.

Mr. Chairman and Members of the Committee, I would like to conclude my statement by reaffirming NAM's commitment and my own to industrial energy efficiency. Through energy conservation, efficient and economic use of our available fuels, and expeditious development of our domestic energy resources, this country can obtain our goal of becoming energy secure.

We appreciate the opportunity to present our views.

Senator Evans. I'm sorry. Would you repeat that last statement?

Mr. Hov. Industry doesn't necessarily respond by saying we'll immediately fund—and they have to fund—a program that will have a payback of less than 1 year.

If you wish, I can respond further now or later.

Senator Evans. You might explain it a little further.

Mr. Hov. In the first place, again it was mentioned that there's a difference to industry between a simple payback and what they look at as a real payback. A 1-year payback is probably about a 1.8-year payback, after tax, to industry.

There is capital, even if it's less than a 6-month—now we're talking about maybe what is more like a 1-year payback to industry. We still have to appropriate capital. It goes into a different pocket for all sorts of accounting purposes and the like, and it takes a little time to perform the paperwork required to get the approvals.

Many times industry has to consider do they want to continue to invest capital at a particular location, because they may consider closing that operation or selling it in the immediate future. So a 1-year payback is not going to be attractive if they get rid of it in 6 months. A lot of other considerations. The debt-equity ratio for the entire company may be in an area where they don't want to increase their debt over a short term. A lot of considerations have to be made really before an investment is made, even a very good one, or what appears on the surface to be a very good one.

Senator Evans. I'm struck by the fact that you said that sometimes paperwork is required. Even industry runs into the same problems as government.

Mr. Hov. We hope we run pretty fast with paperwork, but I'm not so sure that we can't really improve a lot.

Senator Evans. OK. Thank you very much, Mr. Hov.

Dr. Ross.

STATEMENT OF DR. MARC ROSS, PHYSICS DEPARTMENT, UNIVERSITY OF MICHIGAN

Dr. Ross. My name is Marc Ross, from the University of Michigan. For the past 7 years I've been a student of energy use by industry and of the opportunities to improve energy efficiency. And I appreciate the opportunity to present some of my views here today.

I have four main points. The first one—and it echoes what has already been said—the industry has made very impressive strides in improving its energy efficiency, a larger improvement than the other sectors, with a total reduction in energy use per unit of product of 20 percent if we look at what the individual industries have done and create some kind of weighted average of that. Very similar to what the aluminum industry itself—or perhaps Kaiser Aluminum has done.

But of more importance here perhaps, the opportunity to do more with the present technology is at least as large, larger on a percentage basis, comparable in terms of energy savings. That estimate is based on projects that would be primarily on a 1-to 4-year simple payback region.

In addition to that, we shouldn't, of course, ignore the fact that technology is improving all the time. There are many new opportunities which weren't there a few years ago and that is going to be true a few years from now, and how much we will have available will depend on—to some extent, on Federal policies.

The second point I would have is the industry concentrated energy use in the manufacture of basic materials—metals, chemicals, petroleum refining, paper, cement, and such industries—those firms are in a very difficult position these days, as we're all familiar. As we suffer in our international trade, in effect we're importing more energy. And I've made an estimate that our imports of energy in the form of increased imports of materials and decreased exports of materials will be close to 1 million barrels a day of oil equivalent during the next 15-year period. That is, our effective increase in energy imports would amount to that level.

Moreover, the facilities that we retain are difficult to modernize if the industry is in bad economic health. We need to pay attention to the economic health of those industries if we want to see them modernize fully.

For that reason, we need to be concerned about trade policies and R&D policies which affect those industries if our concern is industrial energy efficiency.

Now, I thought—my being a research person—it would be appropriate for me to address at some length, which I do in my written statement that I submitted in advance, our technical posture. The United States is the most advanced country when it comes to basic science, but we are not very competitive with the Europeans and Japanese when it comes to fundamental technology, the kind of technology that is largely funded by the Federal Government, fundamental technology which is relevant to these industries.

So I address that question in terms of examples taken from the steel industry. Let me not go into those details. One of my recommendations is that the Department of Energy could make a shift, with the urging of Congress, make a shift in its research and development priorities to undertake more support, or to support research, fundamental research, relating to the processes, the manufacturing processes of these industries, but do that at a fundamental level.

Finally, I do have some comments on energy-specific policies, and I've paid most attention in my thinking to electricity rates. We, of course, are seeing major changes in electricity generation and distribution technology during these years. We are finally beginning to see that there are relatively inexpensive ways of producing electricity, but we're caught in a regulatory arrangement which is appropriate to past times.

And I would like to see the possibilities of deregulation of generation considered, seriously considered. I would recommend that the restriction on gas-fired powerplants be removed, the restriction that's in the Fuel Use Act.

I would also like to see encouragement in time of day and interruptible rates. Those are, of course, widely existing rates but they have not—we need to encourage utilities to think innovatively about those rates and the way that they are administered in order to help particular kinds of industries.

I happen to—being an energy analyst at a university, I happen to favor collection of data on a mandatory basis. I sympathize with the comments of Mr. Hov. I think that the forms that are being proposed are unnecessarily burdensome, but I think we would suffer in the long run if we didn't systematically collect some data.

Thank you.

[The prepared statement of Dr. Ross follows:]

RO/45

Testimony at the Hearings on Innovative Approaches to Industrial Energy Efficiency of the Subcommittee on Energy Regulation and Conservation of the Committee on Energy and Natural Resources of the United States Senate, October 18, 1985

Marc Ross
Physics Department
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Ann Arbor, MI 48109

I would like to express my appreciation to this Committee for the opportunity to present my views. For the past seven years I have specialized in analysis of use of energy by industry and of opportunities to improve energy efficiency in industry. I have worked on a number of major projects including the Alliance to Save Energy project on Industrial Investment in Energy Efficiency and the Argonne National Laboratory contribution to the ongoing EPA/DOE acid rain assessment.

The Continuing Opportunity to Save Energy and Money

Over the past 12 years industry has reduced its energy use per unit of product an average of 2% per year.[1] This is an astonishing achievement in terms of the concepts of 1973. And yet for most industries the opportunities for cost-effective energy conservation have only begun to be exploited. How can this be true?

The reduction of metal ores to metals is one of the few cases where the laws of nature require a high energy intensity. For almost all the transformations achieved by industry, very little or no energy is required in principle (Table 1). We are finding more and more ways to approach the thermodynamic limits. These fall into two general categories: (1) One can eliminate waste within the strictures of an existing manufacturing process, with measures like steam-line improvements, combustion controls, motor controls, process controls, cogeneration and heat and power recovery. (2) One can adopt a new process which, for fundamental reasons, requires less energy. Good technology is available to seize many of the opportunities associated with approach (1). Some very advantageous new processes are also available. And year by year new cost-effective technologies of both kinds are being developed.

While there have been some investments to improve energy efficiency, the opportunities to reduce energy use are so extensive that at many firms progress continues to be made with relatively little investment. Operations continue to be improved (e.g. through improved scheduling, training, inspection and maintenance). Multi-purpose investments are being made where energy savings are just a part of the justification, as is typical with process control systems. The investments have a high rate of return--the simple payback being two years or less in most cases. In Figures 1 and 2, I show examples of conservation programs, largely representing approach (1), prepared by engineers at a steel mill and petroleum refinery respectively . Only the very rapid payback projects and control systems are actually being undertaken at these plants.

Thus, while progress in conservation has been rapid, it is not at all complete when compared to the opportunity. With current technology, investments in the one to four year payback range offer the opportunity to reduce energy intensity a further 25%,[2] or slightly more than the reduction in energy intensity achieved since the 1973 oil embargo. (If applied to all sectors of manufacturing, thus saving would correspond to 4.7 quads or 2.2. million barrels per day oil equivalent.)

Why It's Difficult for Manufacturers to Improve Efficiency More Rapidly.

Energy efficiency in the energy-intensive industries (primary metals, paper, basic chemicals, petroleum refining, cement and glass) is inextricably bound up with the economic health of those industries. Typically, there are four areas of difficulty facing these industries: demand, international competition, capital availability/strategy, and technology.

The domestic demand for energy-intensive materials is growing slowly if at all. This is not a temporary development, but is part of a profound pattern of historical change. In Figure 3 we see that steel consumption in the U.S. has been declining in relation to real GNP (pounds/$) for 60 years. Steel use per capita saturated twenty to thirty years ago. For some other energy-intensive materials the onset of saturation is more recent (Figure 4), but detailed examination shows that it has arrived.[3] For example, almost all adults in the U.S. have a car and almost all households have the standard heavy appliances. New products such as those in information processing and medicine have low materials content per dollar; the cost is concentrated in the development, fabrication and assembly (and for services, in the provision) of the products. A result of this decline in (tonnage) growth is inhibition of modernization in the energy -intensive industries.

International competition is especially severe for many of the energy-intensive industries. There are several different factors which should be distinguished. The price of energy, in certain important cases, is stimulating expansion of very competitive foreign production capacity. These are isolated sites with rich resources in hard-to-transport forms of energy: natural gas, ethane, hydropower, and, in some inland sites,surface coal. Organic chemicals such as olefins (like ethylene), ammonia and methanol and their derivatives will be produced more in Alberta, Mexico, the Middle East and elsewhere. Primary aluminum will be produced more in Canada, Brazil and Australia and elsewhere. Some of these examples of international competition are shown in Figure 5. In addition, new petroleum refining capacity is being built near foreign oil fields. We are, in effect, starting to import a great deal of energy in the form of energy-intensive materials.

Another advantage foreign competitors have is the strong dollar, another low labor costs, another the more recent vintage of their plants, and another, in special cases, direct subsdidies. These factors must be carefully distinguished, because some are not intrinsic problems, but are policy dependent. I cannot discuss them here.

According to economic theorists capital is always available. In practice in a business whose prospects for growth are low and where international competition is tough, new capital is hard to secure. Extraordinary efforts on the part of top executives may be required to arrange for additional financing without damaging the ratings of a firm. In this situation the capital tends to be spent on new products or acquisitions rather than on modernizing existing factories.

The problems just discussed are in part responsible for a reduced technical capability and for a loss of technical perspective in many of our older heavy industries. It is difficult to be innovative when growth is slow. But this technological decline within industry is not the whole story. In addition, we have a long history of avoiding broad public support of research related to "civilian" industries, with the result that university engineering programs have shifted their focus away from those areas to fields that are publically funded, such as information processing and communication, aerospace and nuclear technologies. Production engineering and metallurgical-process engineering for example, declined dramtically in the last couple of decades. This was a grave error in national R&D policy. In effect, we taught our young people that the basic industries are not technologically exciting. This perception has spread in many cases to the industries themselves. Our competitors in Japan and Europe do not labor under this disadvantage.

Policy Issues: General Policies

Our energy-intensive industries are in trouble, partly as a result of Federal policies. In order to give domestic producers a fair opportunity to become more competitive and more energy efficient, some general policies need to be changed. International trade and R&D policies have high priority.

As a result of the strong dollar in foreign exchange markets, we are reaping the benefit of cheap foreign goods while losing much manufacturing capability. While the overall economy may appear healthy, this policy spells disaster in the long term. Manufacturing is a capital intensive activity often based on skilled labor and, to a large extent, on domestic raw materials. The activity which substitutes for it is distributional, financial and other services. If we concentrate on these relatively ephemeral activities our economy will follow that of Great Britain.

A multiprong response is needed: We need measures to move the dollar downward and against other currencies; I am glad to see that we are finally taking action in this area. The exact notion of fair trade needs to be carefully reexamined. Trade advantages now held by our competitors which are not intrinsic should be redressed. I want to discuss one of the latter advantages, that of technology.

We have a highly innovative society. We have the world's best basic science. We have top quality R&D and lots of innovation in fields like aerospace, information processing, medicine and agriculture. People are not aware, however, that advances in science and technology have also created the potential for advantageous revolutionary changes in the "mature" energy-intensive industries. These new opportunities are being more intensively studied in Europe and Japan than in the U.S. I will briefly describe the opportunity in iron and steel as an example.[4]

Liquid steel is now made from iron ore in a series of large facilities: pellet making, coke making, the blast furnace complex and the steelmaking facility (where the molten blast furnace iron is purified). It is quite possible that by injecting powdered coal and ore into a liquid iron bath the whole process could be accomplished in a single facility, and continuously. Continuous iron and steel making has great implications because instead of batches of hundreds of tons, a major steel mill could operate on a trickle of a few hundred pounds per second--the mass flow of a single file of people walking by. This technology could be so good that it would enable replacement of existing facilities and put the U.S. industry in a strong competitive position with respect to imports. In particular, if the capital and operating costs would be low enough with this technology, the higher labor costs in the U.S. would be more than offset by the extra transportation costs incurred by imports. The energy issue here is not so much energy savings as it is saving energy-intensive metals industries (and basing them solidly on coal).

Little research that might lead to this development is underway in the U.S. The vision does not exist here. Major work on a simpler related process of great promise, coal gasification in liquid iron, is being carried out by two Japanese-European consortia in Sweden, and there is a lot of activity in Germany. (In addition, a related coal-based process could perhaps be developed for aluminum smelting --again with enormous implications for the U.S. industry. The aluminum application would be more difficult to develop but should be explored.)

Steel mill products are made from liquid steel by solidifying the steel in shapes many inches thick. Not only does one need to reheat and roll the material to make it thinner, but it also needs rolling and heat treating to obtain a desirable internal crystalline structure. If the liquid steel were cast in very thin shapes, the cooling and thus the internal structure, could be controlled--for example the liquid could be cooled in roughly a second. A desired internal structure might be obtained directly by controlling the thermal history. Over one third of the energy use by the steel industry occurs in shaping and treating (about 0.8 quads/yr or 400,000 barrels per day oil equivalent). This energy use could eventually be largely eliminated by directly casting near or at final shape. Among many other benefits might be the capability to make demanding products out of steel contaminated by copper, opening up many more markets to scrap steel. This would give the U.S. industry a big advantage because we are rich in scrap. Any increase in the use of scrap would also have major energy savings benefits.

I am delighted to acknowledge the new R&D programs in thin steel casting supported by the Office of Industrial Programs of the Department of Energy. We are fortunate to have the dedicated people who created this program under difficult circumstances. Nevertheless it's important to add that this effort should have had been preceeded and accompanied by a broad range of fundamental research activities. Indeed I am of the opinion that if fundamental research had been active in this general area during the '60s and '70s the situation of the steel industry in the U.S. would be significantly different--and that the development of thin-shape casting might have already been carried out by the industry. This is not, of course, a criticism of OIP, but of our general research policies.

To sum up: Innovation in the U.S. needs to be encouraged on all fronts, in the mature industries as well as in glamorous new industries. One critical component of innovation is technological push, and this depends on fundamental research and on the trained people it generates. The support of fundamental research relevant to the "civilian" industries has been very weak. The Engineering Directorate in NSF should be greatly expanded; they have many more excellent proposals than they can handle. It should be kept a research program and not get into development. At DoE, Basic Energy Sciences should be expanded to include fundamental research relevant to the processes of the energy-intensive industries. We should not rely only on specific development projects like those funded through the Office of Industrial Programs.

Policy Issues: Energy-Specific Policies

I must reemphasize that much of the further progress in energy conservation that might be made depends on the general economic health of heavy industry. Nevertheless there are narrowly focused energy initiatives that could help. I will mention six:

- deregulation of electric-power generation
- the existing prohibition of new gas-fired powerplants
- rate shock associated with new nuclear power plants
- time of day & interruptible rates for electricity
- shared savings schemes for standard types of conservation technology
- information gathering on energy use by manufacturers

Up to the 1960s technological improvements dramatically reduced the cost and energy efficiency of electric power generation. During the past quarter century there have been no further cost-reducing innovations to counteract rising construction costs and to help pay for tougher standards for safety and environmental quality. Now we may finally be emerging from this high-cost thicket. Development programs are leading to technologies which could hold the line in generation costs. I cite one example, the steam-injected gas turbine.[5] This is a very high energy-efficiency system of low cost and short construction lead time. Such technologies and the great improvements being achieved in electrical transmission and its control, suggest that regulation of generation is going out of date. Deregulation would enable use of the new technology even where there are power plants in place, where new technology would provide lower cost power. In order for such deregulation to be effective, transmission and distribution rights would have to be carefully regulated so that all generation firms would have fair access to customers.

The Fuel Use Act of 1978 prohibits the use of natural gas in new electric powerplants. Two things have happened since: the gas supply picture is much better and the technology of gas fired generation is dramatically improving. On the second point the efficiency of new low cost gas turbine systems will be very high: advanced combined cycle systems will have an efficiency of 45% and the even more exciting technology based on aircraft derivative engines, the steam-injected gas turbines, 48%. This provision of the Fuel Use Act should be eliminated.

In certain sections of the country very costly nuclear power plants are coming on line with severe consequences for energy-intensive manufacturers. Of course, ratemaking policies are typically the province of the states, but the extraordinary costs here are leading to some involvement of the Federal government. To the extent that this Committee has a role I suggest application of the principle that these extraordinary costs be shared by all those directly involved: utility investors as well as residential, commercial and large industrial ratepayers. In some cases there is still an opportunity for overall savings by stopping construction and proceeding with far less costly means of power generation or power conservation.

Certain industries are capable of making very effective use of the utilities' capacity to generate electricity cheaply at off hours which exists in most parts of the country, and such arrangements are in wide use. But the full mutual benefit which is available is typically not being exploited. In a survey in the Chicago area we found, for example, that metal melting could be very effectively conducted on a two shift basis if there were a twelve hour low-rate night period. We also found that many industries could effectively benefit from true interruptible service, where the only interruptions would be due to actual system needs rather than to the perceived need of the utility to affirm that the service is interruptible. The local utility that commissioned this survey is taking action to improve its pricing policies for industrial customers. It can be done without putting an unfair burden on other customers. This type of study and change should be encouraged.

The energy-intensive industries are expert in many aspects of conservation and many of their best opportunities are highly specialized. For these reasons the applicability of shared savings schemes is limited. These limitations do not apply in most areas of lighter manufacturing. There the problems are like those in the commercial sector and shared savings schemes need to be encouraged. I do not have the background to state what, if any, legislation is needed.

Information on energy use in every major sector of energy-intensive manufacturing is very useful to firms for purposes of comparison and for goal setting, and to government for general policy making. The trade association effort which produces timely annual reports to DoE on energy-intensity is very valuable both to energy managers within firms and to analysts and policy makers outside. That process should be continued. In effect the good offices of DoE are being used to help motivate and organize a private effort of direct value to the private sector as well as to others. (The summary documentation which is typically prepared some years late by DoE is not very valuable.)

The slower-to-be published but more systematic and complete Bureau of the Census data on energy use has also been valuable. At present the Energy Information Administration is going through a process of developing a questionnaire and survey process to be conducted by the Census which should replace the older Census effort in this area. I find the effort made by EIA, to respond to industry concerns on proprietary information and on the burdensomeness of the survey, commendable. Although the presently proposed survey is still overly long, in my opinion, this data collection initiative should go forward. This triennial survey survey should not be viewed as a replacement for the annual trade association effort.

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TABLE 1

ENERGY INTENSITIES FOR SELECTED BASIC-MATERIALS

	Energy Intensity 1980 (Gcal/tonne)		Thermodynamic Minimum[c] (Gcal/tonne)
	primary energy[a]	carrier energy[b]	
Paper	7.3[d]	5.6[d]	--[e]
Steel	9.4	7.9	1.7
Chemicals	---	17 (for polyethylene)	--
Aluminum	46[f]	21[f]	7.0[h]
Petroleum Refining	1.17	1.08	0.1
Cement	1.7	1.4	0.2

[a] with purchased electricity evaluated at about 2.9 Mcal/kwh (11,500 Btu/kwh)

[b] with electricity evaluated at 0.86 Mcal/kwh (3413 Btu/kwh).

[c] Gyftopoulos et al

[d] wood derived fuels not included.

[e] For paper the absolute value of the minimum is small and its sign depends on accounting conventions and product.

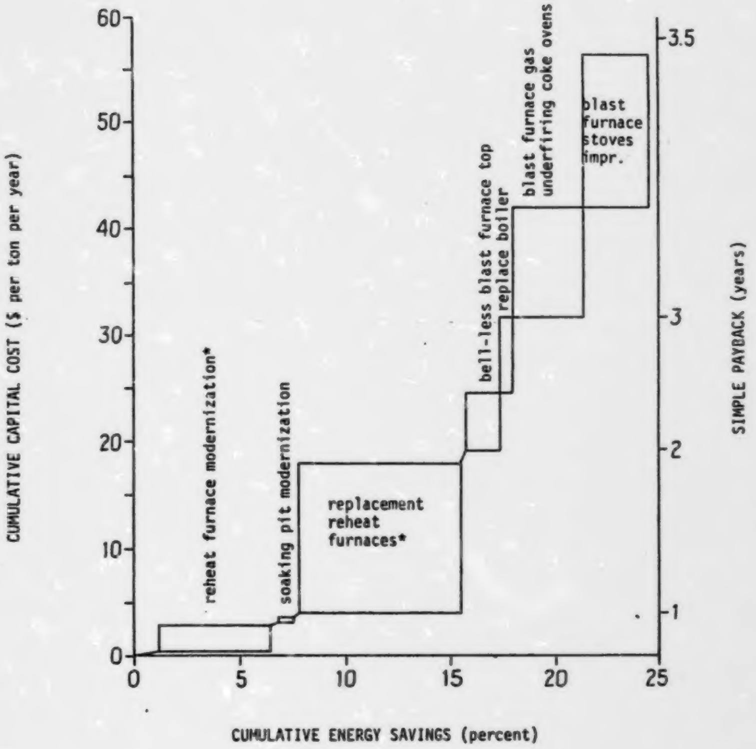
[f] The energy intensities are per tonne of shipped product. If the base is taken to be tonnes of primary plus secondary metal the energy intensities are 17% higher and if the base is tonnes of primary metal it is 37% higher.

[h] per tonne of primary metal.

Figure 1

SAMPLE STEEL MILL ENERGY CONSERVATION PLAN

CAPITAL COST, ENERGY SAVINGS & ECONOMIC PERFORMANCE



*These projects substantially overlap each other. Net total energy savings for the plan are 20%.

FIGURE 2

SAMPLE REFINERY ENERGY CONSERVATION PLAN:
CAPITAL COST, ENERGY SAVINGS & ECONOMIC PERFORMANCE

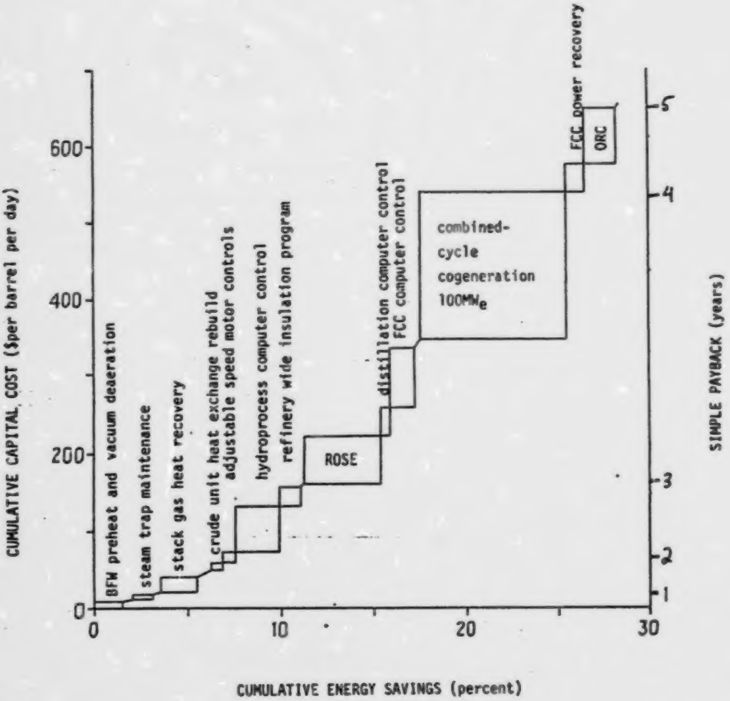


Figure 3

A CENTURY OF STEEL CONSUMPTION IN THE U.S.

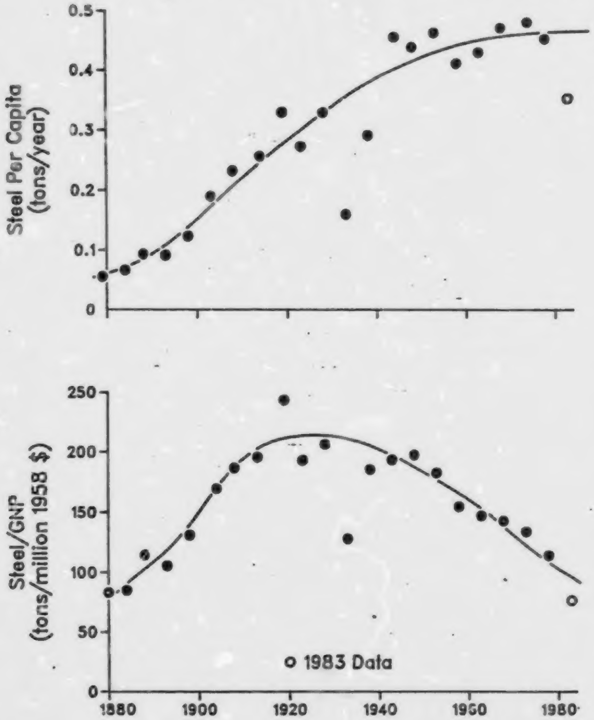
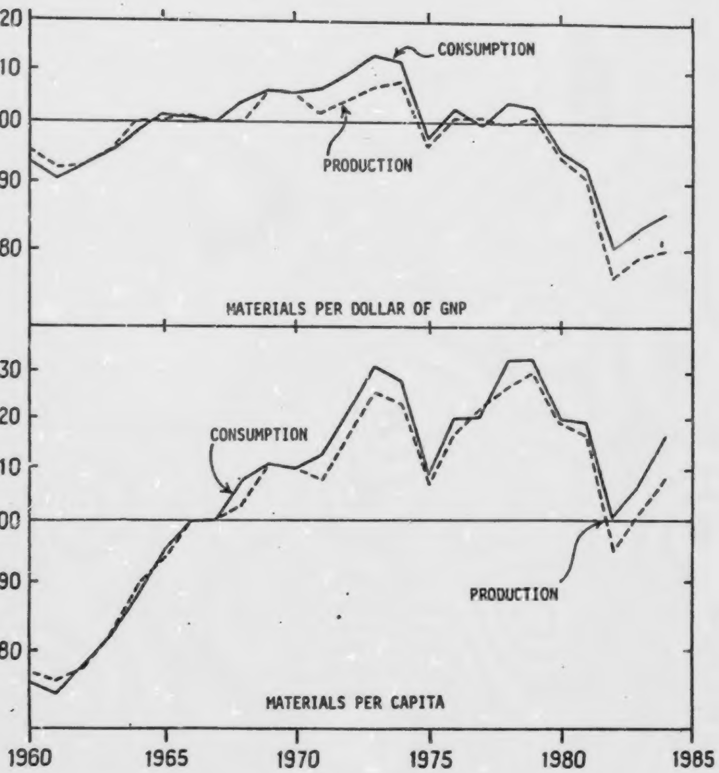


Figure 4

MATERIALS IN THE UNITED STATES ECONOMY *

1967 : 100



*combined using energy-of-manufacture weighting

Figure 5

COST POSITION OF EXPORTERS AND POTENTIAL EXPORTERS TO THE UNITED STATES (PARTIAL LIST)

	Cost Advantage[*]	Rationale
STEEL[a]		
Japan	significant	high technology
East-Asia Rim	major	low-cost labor[b]
Canada, South Africa	marginal	
Brazil	significant	low-cost labor
Europe	uncertain	subsidies
Mexico, Venezuela	uncertain	low-cost labor, gas
PAPER		
Canada	similar costs[c]	
Scandinavia	disadvantage	limited resources
Brazil	significant[d]	natural resources
USSR	uncertain	natural resources
ETHYLENE		
Canada	significant	natural resources
Mid-East	significant	natural resources
Mexico, Venezuela	significant	natural resources
East-Asia Rim	uncertain	
Indonesia, Australia	uncertain	natural resources
ALUMINUM		
Canada	major	hydropower
Brazil	major	hydropower
Australia	significant	coal,[e] gas
USSR	uncertain	hydropower
Other	uncertain	hydropower, flared gas

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[*] Relative to the U.S. The present high value of the dollar also provides an advantage.

[a] All these countries have some or many modern, more productive, mills than in the U.S., although Europe also has many antiquated mills.

[b] Relatively skilled labor and good infrastructure provide a major advantage.

[c] The potential for expansion is more limited than in the U.S.

[d] Expansion will be slow and only hardwood pulp is involved.

[e] Low-quality coal unsuited for export. Some analysts see significant cost advantages in Australia. Others see the opportunity dependent on help, e.g. capital subsidies.

Senator **Evans**. Thank you very much, Dr. Ross.

Let me start with Mr. Pool on recycling, which in the aluminum industry, of course, has been a dramatic energy saving program. You mention in your testimony, you clear up to 52.8 percent. Are we actually now getting back, in your view, over half of the cans that are produced in terms of recycling?

Mr. **Pool**. That's correct. Of the all-aluminum cans in the country.

Senator **Evans**. Now, is that coming—you know, some States have bottle laws; other States do not. There are a wide variety of volunteer programs, recycling centers, voluntary activities, money raising, all sorts of ways to do this. So what are the most effective? What's bringing you back the biggest chunk of cans?

Mr. **Pool**. We think it's basically the economics of the metal. And we set—the industry set some goals and targets a number of years ago on recycling, and then the value of the metal increased dramatically. That helped a great deal. And a lot of the formula came from States, municipalities, the cooperation of a lot of groups like that in getting the systems working.

The role of the industry has turned out to be the buyer of the material. We are a ready market for the material and initially we were involved directly in a number—I'll speak for Kaiser—directly in the recycling programs. We purchase it directly from consumers. We have found over the last several years we have been able to back away from that, and we are now the ultimate purchaser of the material and recycle it back into the aluminum containers, but it's not necessary for us to be out there attempting to interface with every group that's collecting aluminum.

Senator **Evans**. When you say recycle it into containers, I presume you just recycle it into the smelting process, so indirectly it goes back into containers.

Mr. **Pool**. It is remelted, reprocessed, rerolled, and the alloys in aluminum cans are such that they can be repeated back into the same container. So it recycles over and over.

And we think that with and without deposit legislation, that has a bearing. Aluminum is a little unique in that it's a very valuable material, and we think that that will just simply continue to grow and be a very, very successful program both for litter control and for our industry.

Senator **Evans**. As in any free market concept, I presume that you try to get as much back as you can at the cheapest price possible. You're now getting half of it back. Is there still a margin in there where, if you offered a higher price, you could get a higher percentage of it back and still make it cost-effective?

In other words, is there more to go?

Mr. **Pool**. There is certainly more to go. The price aspects—that varies considerably. The price of aluminum on the world market now is on a very depressed level.

Senator **Evans**. I hear that frequently from you and your colleagues.

Mr. **Pool**. In fact, it's below the cost of most U.S. smelters. And so that does become a problem periodically. We attempt to not have that influence the way the recycling programs work. We have committed ourselves to purchase for certain prices. That price does float up and down. I'm not sure I could say we're in the position where we could offer a higher price at this point in time in an attempt to attact more.

Senator EVANS. In listening to your testimony in the framework of some of the other earlier testimony on shared savings and that sort of thing, I know that you've come to Bonneville with what I think is a rather innovative idea which shows that here is a chance to produce electricity from savings at a cheaper rate than—certainly at a cheaper rate than the marginal cost of a new coal plant, for instance.

But it's hard to have a marginal cost concept in the Northwest right now where we have so much surplus and it's lasting so long. The marginal cost of electricity is probably zero. But in the longer haul, it's still, I think, a good idea.

Have you looked at the possibility of the same concept as an energy service company? Is there anybody around who has the resources, financial resources, and who thinks this is a good enough idea that they would fund it on a shared saving basis?

Mr. POOL. We have not looked at seriously at energy service companies in our situation. The opportunity, we feel, for conservation in the Northwest is a rather unique one. Certainly there is a surplus right now, and it's not the kind of a program that we should not be aggressively moving forward right this minute. We think we should be putting the building blocks in place so that the savings can be shared throughout the region at the appropriate time, and we can participate and have some basis for planning on investments.

In other areas, we have not looked seriously at share-the-savings programs and I guess the reasons why would be that electricity is almost our raw material and our life blood. And competitively, I think it would come down this way; we're not in a position to share those savings. We need all of those savings that we can gather through efficiencies.

We need those ourselves, and in better times are willing to make those investments ourselves to capture the full value of the savings. It's our competitive difference. And I don't think an aluminum company, to my knowledge, could consider or has considered in the past a shared savings program.

Senator EVANS. Have you considered any direct negotiation with an investor-owned utility? For instance, even in the Northwest where there is a large surplus, that surplus is divided between the publicly-owned and the privately-owned or investor-owned utilities where the expectations are that the investor-owned utilities will run short and be in a demand position much sooner than the publicly-owned utilities.

Have any of them shown any interest, or have you tried any contact with them, saying, look, you guys are going to need some electricity; here's a way to get it cheaper than you're going to be able to get it any other way?

Mr. POOL. I think we have had some of those discussions. I can't elaborate. I'm not personally familiar with them. I know we have had some of those discussions. What the result has been I don't know. We could certainly get that information to you if you were interested.

Senator **Evans**. I think it would be. It's just that in looking at all of these alternatives, we tend to look at the alternatives and utilize them in a small scale. And now it would be interesting to see whether some of those same alteratives do exist or are practical in the large scale you're talking about.

When you offer up 170 megawatts, that's a big chunk. If that's an average energy basis, that's probably a quarter of a nuclear plant.

Mr. **Pool**. That's right. I'll pin that down and get those results to you.

Senator **Evans**. OK.

Mr. **Hov**. You mentioned the fact that you would like to rescind or restrict the Energy Department's authority to collect energy consumption data. Yet, in your testimony you quoted the data several times. Isn't that a little inconsistent?

Mr. **Hov**. I think we are principally quoting more voluntary data gathering, or through agencies like the Chemical Manufacturers Association, NAM, et cetera. The particular one that we're concerned with right now is the MECS, EIA's CE-846 which we think has a lot of drawbacks and has little value, principally because it would not be current, among a lot of other problems.

It's very detailed. I would be happy to discuss details if you wish, but it's one of those that perhaps Dr. Ross, in voting, had said he'd like to have the data, and we're aware of that; we don't think it's very useful.

Senator **Evans**. So it's a question then of—because it appears not to be very useful or is not as timely as it should be, is that a reason to abandon the data collection or is that a reason to make the data collection more current?

Mr. **Hov**. This is a new data collection request, a new form, more data. And we don't believe it's going to be useful at all to the Federal Government or to Dr. Ross's group or anything else. And it just sounds like it'll be costly to industry.

It was interesting that in all the comments so far on this thing—it's been going on for 2 years, the development of it—all those who were for it, we find, are not anyone who is going to be producing the data. It's just the people who want to use it. And all those who are against it are those who will have to furnish it and bear the cost.

Senator **Evans**. There may well, however, be an ultimate connection. Those who want to use it, if they use it effectively, may well find from the use of that data, the kind of information that will be beneficial to those who are providing it.

Mr. **Hov**. We probably would not be against that kind of stuff if it's going to be useful. But I would like to suggest that I don't know that recently many Government agenices who would like to gather data have gone to the industrial or trade groups and asked on a voluntary basis, can you furnish us this information?

I personally—and my company—would be willing to give a lot of information that we know then is not proprietary, that's going to be used someplace else where we don't like it, we have some control over it that way—we'd be happy to cooperate.

Could I make a couple of comments on the questions for Mr. Pool?

Senator EVANS. Surely.

Mr. HOV. The last one on discussing or negotiating with IOU's. We have done this in the last 10 years since the energy problems, directly with investor-owned utilities and as members of industrial groups in a State, particularly for interruptible rates and for time of use rates. I'd like not to use time of day because time of use is much, much broader, particularly in the cases where use period on weekends of electricity versus use during weeks or during weekdays. And we've been rather successful with most of the IOU's in reaching some kind of a reasonable compromise.

The other thing I'd like to mention—I come from Connecticut now—Connecticut is a very clean State, but we did have some cans and bottles along the road, and it was amazing to me—just a personal observation—within several days, a year or so ago, of passing the Bottle and Can Act, the roads were much cleaner.

Senator EVANS. Those acts have never been passed in any State to my knowledge without violent objection from those who produce the bottles or those who are in the industry. It does have its effect. And that's why I was curious.

In fact, do you know, Mr. Pool—take Oregon as an example—what share—they just had the longest Bottle Act in the country, the longest-lived. What share or how much of that 52 percent do they provide?

Mr. POOL. I really can't answer that. I'd be happy to get that information if you're interested. I just don't know, State by State. I do know that some of the strictly voluntary States are doing as well or better than some States that have passed the so-called bottle bills. And I would contend, even in Connecticut, I'd make you a bet you didn't find very many aluminum cans along the highway there. They're valuable and people will come and pick them up.

Senator EVANS. Dr. Ross, you mentioned an interesting thing in your testimony. You talked about the low level of research. I've not had a chance to look at your detailed testimony. But that—

> The country lags in technology of relevance to the energy-intensive industries, the low level in the U.S. of fundamental engineering research relevant to the production process of these industries.

Why do you think that is?

Dr. ROSS. Well, I guess that the reason is that people have long thought that R&D in mature industrial sectors, with some historical exceptions like the agricultural industry, is the responsibility of the private sector.

I think what we've learned in the past 30 or 40 years is that with the enormously strong role the Federal Government takes in fundamental research in this country, that it's very difficult, at least at universities, to conduct much fundamental research which is not publicly funded. The funding from the Federal Government is overwhelming.

Nevertheless, the Federal Government had a policy of neglecting what are called civilian industries in allocating support for that fundamental research, so that there isn't much fundamental research, very little indeed, relevant to the manufacturing processes of these basic industries or relevant to other areas like construction, for example.

Senator EVANS. I guess the dividing comes in the description of what constitutes fundamental research as opposed to moving over to engineering and applied research. When you're talking about energy-related research in production processes, can you describe for me sort of the fundamental kinds of things that you're talking about, as opposed to what I would suggest probably belong next door in Mr. Hov's and Mr. Pool's bailiwick, the kind of—well, the kinds of things that Mr. Pool's company has done in making the proposal to Bonneville—a substantial amount of their own analysis of a process that would have a great energy savings.

What are the fundamental kinds of things—because you suggest in your testimony that one of your recommendations is that DOE undertake to support such reserarch. And I guess I'd like to know a little more the nature of that.

Dr. ROSS. Well, you know, Kaiser Aluminum & Chemical has a fine R&D lab, which I happen to have visited. But it's not like a university program. We have actually very little in the way of fundamental research on aluminum processes in the United States.

The center for that research is our university programs in Norway, as it turns out. We have very little in steel, which I am more familiar with. We have very little fundamental research in steel processes, in the thermodynamics of appropriate materials, in the appropriate environnents. Just not an ongoing activity in our schools or at the industrial laboratories. The industrial laboratories have to have a somewhat shorter term and more limited viewpoint.

Something that was just brought up provides me with a nice example. We recycle cans into cans. I think it's quite important that we're not recycling aluminum cans into a second class product, some kind of casting. We're recycling it into really prime product, very demanding product. That's an important technical breakthrough.

We don't know how to recycle cars into cars. Cars are melted. It's made into rebars, probably the least demanding of all steel products—just the concrete reinforcing bar—because we don't know how to handle the impurities that are present in that postconsumer scrap.

Senator EVANS. When you say "we," is that we in this country, or we anywhere on Earth?

Dr. ROSS. We anywhere on Earth. It's, I think, a very important research project to understand what the role of impurities is in steel and how the solidification of steel, which is a complicated process, will affect the role that, let's say, copper which is present in automobile scrap will play. It's a very—it's a rather basic question, and it's not something that has been undertaken by anybody in this country.

If you look at the literature, the main work in that field and other fields related to steelmaking is going on primarily in Europe.

Senator EVANS. Will we figure that out about the time we have ceramic engines and fiberglas bodies and no steel left in automobiles?

Dr. Ross. No; not really. I hope we do have modern things like that, but steel is going to continue to be very important, even if it's not a growth item.

Senator **Evans**. One final thing. You mentioned the question of—the question of, frankly, continuing the regulation of generation of electricity; that perhaps you ought to deregulate with some of the new advances in generation.

That's an interesting concept. The old idea that an electric utility is a monopoly I think has rapidly begun to fade simply because there are competitive ways of getting the same energy for many processes. And so it's the constant look for cheaper energy that's causing companies, individuals, everyone else, to look toward competition and the competition of better insulation, the competition of natural gas, competition in a whole lot of ways.

If you regulate transmission and don't regulate generation, would you then ensure or attempt to ensure that there is free—the wheeling of electricity through those monopoly transmission lines at the instance of whoever wanted it and wherever they wanted to buy it, by the energy source?

Dr. Ross. Well, that would of course be critical. In other words, one would have to, I think one would have to be more thorough and careful about regulating transmission to enable wheeling of power than one is today if generation were in some way deregulated. I have no doubt that's the case.

I think I would step back a minute to comment. It seems to me that we have been in sort of a long dry spell of some 20 years or so when technology has not provided cost control in electric power generation. We have not had the new ideas which allowed us to meet the extra costs that have come with increasing fuel prices, that have come with increasing environmental and safety concerns.

We're now seeing technical developments in cogeneration and these new gas-fired technologies which look like they'll enable us to break out of that high-cost situation, at least—perhaps not return to low cost, I'm not saying that—but at last control costs and power generation in the next few decades. We have to give those technologies scope rather than stifling them with regulation.

Senator **Evans**. Well, we certainly capture our own intention in the Pacific Northwest with a sevenfold increase in electric power rates over a 2-year period—that captures your attention and you start looking for alternatives, although I must say that as I go back home and hear my constituents complain about the high cost of electric power and then come back and pay Pepco my bill in Washington, DC, they don't know how blessed they are, even after a sevenfold increase.

Mr. Hov or Mr. Pool, do you have any direct comments on that? Especially, Mr. Hov, you mentioned deregulation of gas and move toward the free market and some of the other elements of energy. What about the deregulation of electric generation and maintaining the transmission presumably, and the distribution under a regulated utility?

Mr. Hov. On the deregulation of generation, I don't think I can really address it. First, I can't address it for NAM. That's not been a topic that's been open. Even for myself, I'm a little ambivalent and would like to have more clarification, more understanding on the deregulation of generation.

The long-range planning problem the utilities have——

Senator EVANS. Isn't there something of a corollary between deregulation in production of natural gas and deregulation of generation of electricity?

Mr. HOV. I don't necessarily see that they have to be exactly parallel at all.

On the deregulation of transmission, or the regulation of transmission, if you will, to allow wheeling, we are on record; I think most of industry is on record as supporting this as a concept because we think it can be useful to the country, economically useful, and more utilization of the facilities we have.

The deregulation of natural gas, I think, is a very—should be a very simple thing. But it would take congressional action.

Senator EVANS. That's why it isn't simple. You should have been here a few weeks ago on a hearing that was held on that subject.

Mr. HOV. I am reminded in 1980 that the concept of deregulation of oil was touted and everyone was yelling and screaming at the fantastic runup in prices that would occur because the oil industry out there would really sock it to the public, and as soon as oil was deregulated, the cost of oil came down.

In 1982, 1, 2, 3, and 4, the possibility of the Natural Gas Policy Act deregulation on January 1, 1985 of roughly half of the natural gas was touted as it's going to be tremendous; the price is going to just kill us. And as soon as the natural gas in part was deregulated, the price went down. I think there's a story there.

I'm not going to suggest that if we totally deregulate all natural gas at the wellhead the price is going to go down, but I don't think there is going to be a fantastic runup either. And I think it's going to be—we would like to see the free market have more of a say in how we do our business, less governmental controls, except there are certain areas where we definitely need governmental controls.

Utilities, certainly there's got to be some either State, Federal, or otherwise controls in the area. But we'd like to see less and less if we could.

Senator EVANS. Mr. Pool.

Mr. POOL. May I comment on the same question?

Senator EVANS. Sure.

Mr. POOL. I think we've looked at the deregulation of electricity and we look at electricity a great deal, as you know. I think our analysis would come down more in favor of deregulation of transmission than of generation.

We see a good bit of the problem of high-cost electricity being a regulatory problem, a utility delay problem, probably more in the past decade. Simply the problems of constructing powerplants and the absence of the driving forces that cause those things to be completed on time and on budget, and that probably has had more to do with the rise of our electricity costs in the country than the introduction of new generating technology.

We find there are a lot of generating plants around the country that really, by today's standards, are not measuring up to the efficiencies that they should be, and yet they're still in the system. The regulatory system allows those bills to be paid. And we think that deregulation of transmission and allowing sellers of efficient and low-cost electricity—cogenerators, other systems—to get together with buyers and move that power, willing buyers, would drive the industry toward higher efficiencies probably much faster than the deregulation of the generation.

Mr. Hov. Can I add another comment, because I'm very interested. And, of course, Dick and I travel the same general areas.

We've been cogenerating for two decades or more. At a minimum, I'd like to see the ability of a cogenerator to move excess power from one of his plants to another one of his plants—at a minimum—as an opening wedge.

Dr. Ross. I guess we may have a little semantic problem. I support exactly what Dick Pool is saying. I used other words to express it, I guess; that when there are opportunities to generate power more cheaply, we should make sure that there—we should move to make sure that there are arrangements to get that power to buyers.

I call that deregulation of generation and more careful regulation of transmission, and he's expressed it the other way around. I guess we have a little bit of a language problem, but I think we want the same thing.

Senator Evans. Very interesting. Thank you very much, gentlemen.

Let's turn to panel No. 4. Jim Wolf, executive director of the Alliance to Save Energy; and Mr. Howard Bozich, president of the National Association of Energy Service Companies.

Jim.

STATEMENT OF JAMES L. WOLF, EXECUTIVE DIRECTOR, ALLIANCE TO SAVE ENERGY

Mr. Wolf. Thank you, Senator Evans.

My name is James Wolf, executive director of the Alliance to Save Energy. I appreciate the committee's opportunity to testify today. And particularly, Senator Evans, we appreciate you as chairman of the Alliance.

I wish today to address three areas of the committee's concern. First I want to identify some of the key reasons we believe larger opportunities still exist for energy efficiency improvements.

Second, I want to identify four needs that we at the Alliance have identified that must be met to help our Nation tap these opportunities.

And finally, I want to review some innovative approaches to addressing each of these needs, as well as suggest actions for the committee as well as the private sector to consider to tap the opportunity.

My testimony today will be based on our ongoing research, demonstration, and education projects at the Alliance. As a noprofit coalition we conduct projects in all of these energy use sectors, and so therefore I'll mention briefly some projects that we have underway in the residential and nonprofit sectors, as well as the industrial sector.

The three key reasons we believe there are for large energy savings opportunities still available in the economy are, one, capital availability. This clearly is a continuing problem with the industrial sector as well as the governmental sector.

Whether it is a capital rationing process in a corporation or the inability of Government in a time of scarce resources and governmental deficits to allocate capital, many good energy-saving opportunities are not being invested in by both industry, local, municipal, as well as the Federal governments.

The second problem is a lower interest in conservation and efficiency improvements. This is clearly demonstrated, for example, in a recent article in Energy Users News of September 8, where the industrial energy managers were interviewed and said for the first time in several years, the payback criterion that they had to meet to ensure that their projects would be funded was being shortened significantly.

Industrial energy managers testified that currently the need for a payback to be funded was in the 1- to 2-year range, whereas recently as 2 to 3 years ago they could get projects funded in the 3-year range. This lower interest in conservation is reflected in many industrial corporations that we've dealt with have eliminated their energy manager position on perhaps the false notion that our energy problems are behind us.

Even our newspaper headlines tend to focus today on the declining price of oil and not the remaining energy efficiency opportunities.

The third reason we have seen for still large energy saving opportunities are really the inability of energy users to conduct both technical and financial evaluations of energy investments, and I believe the key attributes are that they're two separate problems—the technical evaluation as well as the financial evaluation. And we've seen this problem in all categories of energy users.

A recent survey conducted by the Alliance of Nonprofit Agencies showed this was one of the primary reasons that many of these agencies could not invest. It was not only the lack of financial resources, but it was even the inability to conduct good technical or financial evaluations.

In our work with the industrial sector, it's interesting to note that we found that energy managers are typically excellent energy engineers. I know, Senator Evans, that's your background as well. We found, however, that they were not as good at financial evaluation, frankly, and they frequently had difficulty dealing with their corporate treasure or others responsible in the cooperation on the merits of the financial attributes of an energy investment. And certainly homeowners throughout the country are hindred from making energy investments by the difficulty they have in evaluating whether or not products work and what the financial returns will be from an energy efficiency investment.

An indication of the range and the size of the energy efficiency opportunities we see is in a recent study we conducted with an electric utility. Only 1 in 7 of every cost-effective energy efficiency investments had been implemented by their own commercial and industrial customers. And I emphasize again, this was not the residential consumers; it was the commercial industrial customers.

And in case studies we've conducted with many industries, looking at their capital allocation process, we found that energy efficiency is still available at an effective rate of $10 per barrel of oil or equivalent to produce conservation energy. The rates of returns on many projects were in excess of 30 percent.

The needs we have identified from a national perspective that we believe must be met to ensure that this opportunity is tapped can be broken down into four separate categories. The first is we need credible and reliable consumer information of all energy end users. The second, we need a credible and reliable energy efficiency delivery system. The third is we must encourage long-term planning by all energy users. And finally, we must encourage and pursue least-cost planning.

I'll briefly highlight some innovative approaches to address each of these needs that we see, as well as put forth our recommendations to address these needs.

The need for consumer information is paramount for all energy use sectors. What we've discussed extensively, shared savings and performance contracting here today, our experience at the Alliance is that this concept is still widely unknown. We get called to put on seminars, typically sponsored by many State and Federal energy offices, but when energy users call our office as an independent nonpartisan source of information, we can't sell them anything, and they're saying what is this concept; is it any good? They really don't know it.

I would concur with the comments by Mr. Burman from Washington State that their attitudes typically do run a cycle. One, it seems too good to be true. Second, it seems to be a tax scam. And then, third, if the opportunity is that good, I'll invest my own money.

And the main problem with the final I'll-invest-my-own-money attribute is, they typically then wait 3, 4, 5 years before they do that.

Candidly, as I tell them when we evaluate performance contracting for them, I tell them I'm indifferent whether or not they do performance contracting or invest their own money. I just want make sure they somehow take advantage of a good opportunity.

I think it'll be very significant to this committee in particular, as you touched upon, international competitiveness; that we are aware and in fact participated, and that the regional governments in Spain, provincial governments in Canada, the European Economic Community, are all actively pursuing performance contracting. They are conducting seminars for energy users, and they're encouraging the development of the industry there.

They view this as essential for international competitiveness. The steel industry in northern Spain, for example, is very, very interested, in reducing energy costs by performance contracting, and with encouragement from the regional government in Spain they intend doing this.

My recommendations for the committee would be, the Department of Energy should be much more actively encouraged to do workbooks, seminars, similar to some of the work that the State of Michigan is now doing, targeted for energy end use sectors.

The second need we've identified is the need for that reliable energy delivery system. Indeed, performance contracting addresses some of the reasons, some of the ways this need can be met, whether through the provision of capital, the addressing of technological risk, or the addressing of price risk.

Some of the innovative approaches we've seen to ensure a reliable delivery system that encourage us are utility subsidiaries now offering energy services. There are about 10 around the country that are now actively employing an energy services subsidiary.

This is still somewhat controversial in many areas of the country, as are the appropriate scope of utility activities, whether or not utilities should be permitted to install insulation in a residential home or other activities of that nature. But the shared savings subsidiary, we believe, holds great promise.

Another innovative approach is the general public utilities approach where they're doing shared savings for residential customers. This is the only area that we know that the residential sector is being met by this type of innovative delivery service, where the home is retrofitted at no cost to the homeowner and the homeowner and GPU and the contractor divvy up a share of the savings arrangements.

Our recomendations for this committee include that the Public Utility Holding Company Act be reviewed because many utilities who are interested in establishing shared savings subsidiaries have told them that this act prohibits them at the current time from engaging in certain types of services. And this includes both gas and electric utilities that want to pursue this, but feel the current legislation is unduly burdesome and restrictive.

We believe it is time that that act be fully reviewed.

In addition, another recommendation we would have is we found particularly for the homeowner sector, that contractors and installers are unfamiliar with new technologies and we at the Alliance have a training program where we are training State contractors in the new heating system technologies. We question whether or not this committee should require that for DOE to give States money, that contractors be required to come through some sort of training course to ensure that they're familiar with the best available technology as a condition for Federal funding.

The third need we've identified is that necessity to make long-term commitments to energy efficiency. With payback opportunities extensive but industry and others increasingly requiring shorter paybacks, this we believe is one of the prevalent problems preventing energy efficient opportunities.

There's no current crisis in energy efficiency, to be sure, and to use a phrase the adminstration has popularized, I would view this as our "window of opportunity." And frankly, the next few years is really the window of opportunity for when we should be pursuing energy efficiency. Now is the time to act, but now is precisely when people have become complacent.

We at the Alliance are doing some work to ensure that people are willing to make those long-term investments. We've developed computerized software for energy managers that does a 25-year spread sheet analysis, and will also assist them with those financial tools that they have been unable to, or are lacking in presenting to their corporate treasurer.

We're working with the mortgage market so a homeowner will be encouraged to purchase an energy-efficient home, again which may initially be more expensive, but now there are new lending programs that will help homeowners purchase the energy-efficient home, or even retrofit an inefficient one. And again, this is a long-term commitment to energy efficiency, so you don't take the superficially short-term option of buying that cheaper but energy-inefficient house.

Our recommendations for the committee include exploring the use of the voluntary industry guidelines and goals for energy reduction. These were very successful during the 1970's and we would encourage the committee to encourage the Department of Energy to work with industry and the Department of Commerce to establish new energy efficiency goals.

Many energy managers of industry have told us this was very helpful to them in getting their projects funded, in raising their own visibility within the corporation. In fact, as I said, many energy managers now find their jobs disappearing.

We certainly support on the long-term necessity for investment the Federal Government's pursuing of shared savings, and we think there's incentive that guidelines be defined for when this should be pursued and how it will be implemented.

Concerning the questions you had asked about whether or not an incentive should be provided to a public agency or public sector who invest in insured savings, I would add that from our experience it's been a pernicious problem with both the public and private sector, and I'm sure that Mr. Bozich can testify from the shared saving industry perspective.

Unless there's an incentive, we frankly found that many energy managers are outright hostile to the concept of shared savings. They frankly view it as a threat to them frequently and their ability within a corporation. And this is again in both the public and private sectors.

We encourage that there be some kicker left in for the agency, the entity who pursues shared savings.

The problem with it, when a shared savings company or others approach a facility for shared savings, the CEO or VP in charge typically assigns it to the energy manager. They say it's an energy issue; it's your evaluation. And unless there's going to be something in it there for the energy manager, we fear that it will not take hold and really fulfill its potential.

Finally, the need we have identified to pursue least-cost planning. We work very closely with the utility industry, both gas and electric, but the observations we see, particularly for electric least-cost planning, can be summarized by two.

One, there are many, many conservation programs, but typically these are much more residentially oriented than they are for the commercial and industrial sector.

Two, least-cost planning is at best done on an ad hoc basis. Implementing conservation programs does not mean implementing comprehensive least-cost planning. A recent survey we just completed—and a study will be published—showed that only 8 out of 36 organizations we surveyed had a comprehensive methodology to assess conservation potential in even 1 of the 3 energy use sectors.

This clearly is the first step and only a first step to pursue least-cost planning. I'm sure you will be pleased, Senator Evans, that we note that BPA was among the most advanced of the least-cost planning methodologies we studied and I think the opportunity is there for other sections of the country to learn extensively from them.

We're now working with the general public utilities and working with methodologies to determine how a utility should approach committing optimal resources to least-cost planning and have had input into the Michigan studies as well.

Our recommendations for the committee include the necessity for the Federal Government to become much more active in pursuing and encouraging States to pursue least-cost planning.

The Federal Government has primarily viewed it as a State issue. I think there are opportunities for coordination, for technology transfer, for methodological development that the Federal Government should do among the States.

Also, we believe, as you touched upon, the issue of deregulation of generation from transmission is a complex one. We believe it may have opportunities. Now is the time to start framing the issue. It is a long-range issue, but the problem here, as in many other areas, is that regulation has not kept pace with technology.

I think that clearly was the case with the phone company and the telecommunications industry, which effectively we had long distance bypass of the AT&T network, and the regulation was not premised on that.

Similarly, one can view cogeneration now and other technological developments as bypass of the electrical utility industry and the regulation is not being kept up to pace with the technological development. Now is the time for us really to start exploring this, and we would encourage the committee to direct DOE to get a task force underway.

We appreciate the opportunity to testify. I would be pleased to answer any questions?

[The prepared statement of Mr. Wolf follows:]

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Recommendations for Federal and Private Initiatives to Stimulate Investment in Energy Efficiency

Testimony of
James L. Wolf
Executive Director

Before the
Subcommittee on Energy Regulation and Conservation
Committee on Energy and Natural Resources
United States Senate

October 18, 1985

INTRODUCTION

I am James Wolf, Executive Director of the Alliance to Save Energy. Thank you, Senator Evans and subcomittee members, for the opportunity to testify before you today on behalf of the Alliance. I also wish to personally thank you, Senator Evans, for your leadership as Chairman of the Alliance.

My testimony will discuss three areas of the Committee's concern. First, I will present some of the reasons a substantial opportunity exists for worthwhile energy saving investments in every sector of our economy. Second, I will review several innovative approaches bringing new energy efficiency technology and means of project financing to industrial firms and other energy users. Third, I will present recommendations for federal and private initiatives to continue our nation on the path to energy efficiency. These recommendations are organized around four needs we have identified in the market for energy efficiency goods and services. The recommendations are not, we believe, costly actions that would unduly burden federal or private resources.

The Alliance is uniquely qualified to present these views. As a nonprofit coalition dedicated to increasing energy efficiency, we conduct research, demonstration, and public education projects with every energy use sector. Our perspective is based on the Alliance's own research projects with industrial firms, small business, consumers, homeowners, utilities, lenders, trade associations and others concerned with energy use and improvements in efficiency. In these projects, as on our Board of Directors, we seek to involve and obtain guidance from all interested parties and organizations -

ranging from energy producing industries such as oil companies and the utility industry, to those most severly affected by high energy prices, such as the elderly.

PROGRESS AND REMAINING OPPORTUNITY

Few actions in the 1970s and early 1980s had a bigger impact on the pocketbooks of America's businesses and households than the dramatic increase in energy prices. These high prices and fears of a continued spiral of shortages and price increases greatly influenced our consumption patterns and our rate of investment in energy saving measures. A prime indicator of the progress we have made improving our energy efficiency - energy consumption per dollar of GNP - shows that consumption has dropped over 20 percent in the twelve years since the first embargo.

In spite of this progress, studies by federal agencies and the Alliance, and our actual field experience with industrial firms, equipment contractors and others demonstrate that significant energy savings opportunities remain. For example:

o An Alliance analysis of investment practices in 15 case-study firms in the five most energy-intensive industries found that substantial opportunities exist for cost-effective conservation investments - and that the majority of these projects save energy at an effective cost of $10 per BOE (barrel of oil equivalent) or less. The rates of return on these projects often are in excess of 30 percent.

o An Alliance project conducted with a major electric utility found that the utility's commercial and industrial customers had invested in only one out of every seven cost-effective conservation investments available to them.

The reasons why cost-effective opportunities remain in our businesses and homes must be evaluated to determine what are appropriate responses by the government as well as private institutions or individuals. The Alliance finds several reasons common to every sector of the economy. The first of these is the availability of capital. In our study of energy-intensive industrial firms, we found that two-thirds of the companies practiced capital rationing, under which many projects with attractive rates of return are deferred because the firm sets aside only a limited amount of funds for investment. The willingness to commit funds and the availability of capital is also a pervasive problem with small businesses, nonprofit organizations, and governmental agencies.

Another reason investment is impeded is a lack of skills in evaluating efficiency investments and convincing top management of both their technical feasibility and financial benefits. We found that even large businesses with sizeable engineering staffs face problems getting projects funded, because frequently those engineers don't have the financial skills necessary to convince management to fund energy-saving projects. A recent national survey conducted by the Alliance of energy practices of nonprofit agencies, found that more than a third of the agencies were inhibited from making investments by a lack of personnel and expertise in energy management. Homeowners often do not know to whom to turn for reliable and credible information on technologies or savings claims.

The problems of shortages of both capital and experienced personnel have been compounded by decline in interest in conservation. We found in our industrial study and through our other projects with industrial energy managers that top level managers of firms have turned their interest away from conservation as energy prices and supplies stabilized in the early 1980s. While energy conservation at one time held managements' attention, firms have often eliminated senior positions responsible for corporate energy management that were initiated in the 1970s. This change in commitment at the top management level has impacted project identification at the engineering level. Lower level managers will not commit resources to evaluating energy efficiency investments if they know funding is unlikely to be available.

The problems of a lack of capital, limited ability to perform technical and financial evaluations, and a complacency towards investing in energy efficiency projects combine with other barriers to result in untapped savings opportunity in every sector of the economy. Collectively, overcoming these barriers to efficiency investments could result in substantial savings for our economy. For example, a 1984 study by the Congressional Research Service found that the average American homeowner could reduce energy consumption by at least 28 percent through cost effective investment in energy efficiency. If energy consumption in each house were reduced by just ten percent through investment in energy efficiency, about 9.5 billion dollars would be cut from our national residential energy bill. These savings, along with the savings that are possible in the industrial, commercial, government, and nonprofit sectors would increase purchasing power and provide capital for businesses to modernize and expand. Equally important, these savings would help reduce our 60 billion dollar a year imported energy bill, potentially cutting our national trade deficit significantly.

INNOVATIVE APPROACHES TO EFFICIENCY AND RECOMMENDATIONS FOR INITIATIVES TO INSURE PROGRESS TOWARD AN ENERGY-EFFICIENT ECONOMY

Alliance projects reveal the depth of good energy efficiency investment opportunities. We have also developed as well as observed some innovative means of delivering conservation services to tap this opportunity. While conducting our programs, we have identified four critical needs that must be addressed to ensure progress toward an energy-efficient economy. For each of these needs, I will first highlight Alliance programs and some other ongoing innovative approaches to address it, and then present our recommendations of actions for this Committee and private organizations to consider. My discussion shall consider all energy use sectors since each is of concern to the Alliance.

The four needs we identified are (1) establishing programs or mechanisms for providing energy users with credible and reliable information on products, contractors and financing options; (2) establishing and ensuring credible and reliable conservation delivery systems for conservation products and services; (3) encouraging and assisting homeowners, nonprofits, industry and government sectors to make long term commitments to energy efficiency, (4) encouraging and assisting electric utilities, public service commissions and others to pursue least cost planning.

Establishing a Credible, Reliable Consumer Information Mechanism

Industrial/Institutional/Governmental Sectors

Several gaps exist in providing information to consumers on products, financing sources and delivery mechanisms. Many industrial and commercial businesses that are capital constrained are not aware of the many new means of outside or third-party financing sources for projects. We have also seen where smaller industrial and commercial firms are foregoing energy saving opportunities because they lack the technical expertise necessary to identify and evaluate projects. To overcome the barriers which inhibit industrial and commercial firms from making conservation investments, some innovative mechanisms have been developed that combine technical expertise with project financing. These mechanisms include shared savings, guaranteed leasing, guaranteed energy savings as well as others. They may be grouped under the heading "performance contracting."

Performance contracting is a new approach offering financing and conservation services to customers. It is offered by energy service companies, as well as manufacturers, installers and financiers of energy conservation equipment. An energy service firm, for example, typically provides one-stop shopping for the customer by offerring an audit of the customer's facility, followed by the installation, financing, and maintenance of energy conservation equipment. The firms offering performance contracting are assuming the technological risks that the energy user may be unable to evaluate or unwilling to assume.

The Alliance is taking a lead role in bringing information to businesses and state and local governments on performance contracting methods. We do not advocate this form of contracting as necessarily the best method to achieve energy improvements, but believe it is an option that some users will find most attractive. We are presenting energy users with information about the advantages and disadvantages of performance contracting so they can make informed decisions when considering using them. For example, under sponsorship of the Michigan Energy Administration, we are preparing workbooks that will help managers in schools, small businesses and other facilities evaluate various performance contracting techniques. We have also conducted seminars on these financing methods for businesses and goverment agencies.

It should be significant to this Committee that several foreign countries are aggressively promoting performance contracting. They view it as an important component to promote their industries international competitiveness. For example, some regional and provincal governments in Spain and Canada are taking an active role in encouraging the development and use of these financing mechanisms. Similarly, the Euorpean Economic Community has a study underway evaluating how to encourage performance contracting. The governments are both educating potential users about the techniques and encouraging the development of the industry.

Residential Sector

Consumers in the residential sector are also inhibited from making investments in energy efficiency because they lack credible and reliable information on products and installers. Stories of products that don't achieve any savings and of fraudelent or incompetent contractors abound and hinder consumer investment.

The Alliance tries to address the need for credible and reliable information through our national public education campaign. We offer a free booklet, Your Home Energy Portfolio, which discusses new energy-saving technologies, performance information on heating and cooling equipment, and new means of financing energy-efficient homes.

Recommendations

To fill significant gaps in the delivery of information to energy users in all sectors, we recommend this Committee consider the following actions:

o Direct the Department of Energy to take a more aggressive role in transferring information to energy users about performance contracting. This could be achieved through joint efforts with state energy offices, national and state level business trade associations, and through associations representing various county, municipal and other government agencies.

- o Direct the Department of Energy to work with the Federal Trade Commission to initiate a study on the effectiveness of current private and public mechanisms to test and certify the effectiveness of energy-saving products and claims - particularly those targeted for the residential consumer. DOE should also be asked to report on its ability to provide product testing and certification or means to support or begin private mechanisms.

- o Direct the Department of Energy to investigate procedures for certifying at the state or local levels installers of energy saving products and prepare a recommendation for the Committee on an appropriate private or public institution that could provide that certification.

We believe the private sector should also consider what it can do to improve the delivery of information to energy users. National trade associations representing product manufacturers and equipment installers should cooperate with DOE and the FTC on these studies.

Establishing a Credible and Reliable Energy Efficiency Delivery System

The second need which federal and private initiatives may ameliorate is establishing a credible and reliable delivery system for bringing energy-efficient products and financing to energy users. Some of the initiatives already discussed to ensure energy users have reliable information will also ensure a credible delivery system exists to provide conservation services and financing. However, there are some additional actions that should be considered.

Industrial/Institutional/Governmental Sectors

Over 10 electric utilities are taking an innovative approach to the delivery of total "energy services" by offering their customers energy conservation services and financing through subsidiaries. The Alliance has developed a framework to assist utilities evaluate the merits of establishing subsidiaries to provide total "energy services" - the installation, maintenance and financing of equipment - to meet the customers need for energy. Because of their established relationships with users, reliability and access to technical expertise, and access to capital, utilities are in a good position to offer innovative delivery of conservation services. These subsidiaries have most oftened targeted their marketing efforts to the commercial and industrial sectors. In a few instances, utilities have offerred shared savings arrangements to users in a sector not pursued by private companies - nonprofit organizations.

The scope of conservation delivery services appropriate for a utility has been a subject of much concern of the small business community - particularly for residential customers. Yet the issue is significant for other sectors as well. For example, several utilities, and many gas utilities in particular, have told us the Public Utility Holding Company Act prevents them from establishing subsidiaries to offer energy services to industrial and commercial firms - a service they are interested in providing. We believe the potential of the utilities to deliver good conservation services justifies an examination of this issue.

Residential

New delivery mechanisms for residential customers are also needed. Unreliable information as well as untrained installers and contractors of efficiency products hinder the homeowner from taking any action.

The Alliance has a program to introduce state weatherization program directors and heating contractors to new heating system technologies. We have found that few contractors are aware of such technologies and that there is no industry mechanism available to provide them with information on new products and installation procedures. Our training program is operating in 20 states, and emphasizes heating system technologies only. We are aware of no other national training program for the installation of either heating equipment or other new energy efficiency technology.

To a much lesser degree than for the industrial sector, utilities and energy services companies are being innovative by bringing performance contracting to the residential sector. One utility, General Public Utilities, has tested the application of shared savings with its residential customers. Under this program, GPU contracts with energy conservation companies to provide retrofits to the utility's customers. The company is not paid for the cost of the retrofit, but only for actual reductions in kilowatt-hours used by each customer. It is a residential performanced-based contract - a new delivery system.

The utility benefits because it can purchase additional electricity supplies - in the form of conserved energy - at a cost substantially lower than that of building new capacity. The private conservation companies earn their return based on the amount of electricity they save. Consumers reap benefits - lower electric bills - from conservation measures that are installed at no cost to them.

Another innovative residential program is now being test marketed to homeowners in Minnesota. Under that program the conservation firm - Sentinel Energy - is marketing their services directly to the customer without the involvement of the utility. Sentinel installs the measures at no cost and receives a share of the savings in fuel bills that are realized from the installed measures for a period of 5 years. It's too soon to know if this program will be successful.

Recommendations:

To improve the delivery system of supplying energy conservation products, financing, and services, the Alliance recommends this committee consider the following actions:

o Direct the Department of Energy to evaluate whether regulatory and legislative restrictions that inhibit or prohibit electric and gas utilities from establishing subsidiaries to offer conservation services and financing should be modified to allow and encourage these activities. Particular attention should be given to the Public Utility Holding Company Act.

o Direct the Department of Energy to evaluate how it can improve the flow of information on new technologies to the contracters that sell and install the measures.

o Direct the Department of Energy to investigate and recommend to the committee whether States be required to submit to DOE a plan for contractor education and training as a condition for receiving federal grant monies for conservation.

Encouraging and Assisting Energy Users In All Sectors To Make Long Term Commitments to Energy Efficiency

A third need currently not being met is to encourage and assist long term commitments to energy efficiency. Our culture and country have a history of superb responses to short term crisis, but a secure and productive energy future for our nation can best be assured by sound planning with a long term view.

Industrial/Commercial/Institutional Sectors

Many industrial firms have dropped the senior level energy management positions and their strong corporate commitment to energy efficiency. This complacency is quickly felt at the engineering level and has resulted in a drop in identification and evaluation of energy efficiency projects. We have been told that the voluntary efficiency performance goals that were instituted by the Department of Energy in cooperation with industry in the 1970s were a useful means to get energy conservation projects funded. Although the goals were achieved, no new goals have been established - adding further to the general complacency that exists at senior management levels.

The Alliance has been working to encourage and assist businesses in making informed, long term commitments to energy efficiency. We recently developed an innovative software package which energy managers and engineers in industrial and commercial firms and other institutions can use to evaluate conservation investments. The ENVEST software allow users to generate spreadsheets and graphs showing the financial merits of any energy related investment. It can be used to show yearly cashflows for up to 25 years and perform sensitivity analysis on key assumptions such as energy price forecasts. It facilitiates long range planning as well as addresses the first need we identified - getting reliable, credible, useful information to the decision-maker.

Additional complancency and short-sightedness about energy efficiency is prompted by the federal government itself. For example, it is failing to keep its own facilities energy-efficient. While state and local government agencies have been aggressively pursuing conservation investments, the federal government has been remiss. Federal government agencies have in fact been blocked from taking advantage of performance contracing arrangements. Legislation which would allow that is timely. Furthermore, goals and timetables should be established to demonstrate the continuing commitment to energy efficiency.

Residential Sector

To encourage and assist homeowners to engage in long term planning, we have been working with banks and other lending institutions to expand the availability of two energy efficiency financing mechanisms offered by Fannie Mae and Freddie Mac- the predominant institutions in the secondary mortgage market. These two mechanisms make it easier for consumers to purchase an energy-efficient home or to finance improvements as part of the mortgage when buying an inefficient home. Under these programs, consumers will not be just responding to the short-term apparent attractiveness of a cheaper, but energy-inefficient home.

Potential homebuyers are limited in the amount of money banks will loan them for a home by a standard ratio of total housing expenses to income. Banks offering the first new energy efficiency financing mechanism will, however, allow buyers of energy-efficient homes to qualify for a larger mortgage than they would under the standard ratio. This increase reflects the additional money the consumer has available due to decreased monthly energy costs in an efficient home. Buyers can purchase a more expensive - but efficient - home at a total monthly cost (energy plus mortgage) that is typically equal to or less than the monthly cost of buying an inefficient, less expensive home.

The second program incorporates the same principles as the first, but allows consumers to improve inefficient homes at the time of purchase and add the cost of improvements to the mortgage. The favorable financing terms of a 15 or 30 year loan are an attractive incentive for consumers to make major improvements to a home.

Recommendations:

There are several actions this Committee and the private sector can undertake to encourage long term commitments to energy efficiency. The Alliance recommends this Committee consider the following actions:

o Encourage the Secretary of Energy to establish, in consulation with industry, new voluntary energy efficiency goals. The Industrial Energy Efficiency Program that operated in the 1970s resulted in remarkable success. To continue our progress, we should set new goals to be reached in 1990.

o Direct the Department of Energy to report to this committee an estimate of the cost-effective energy savings potential in federal facilities. This committee should also support a federal policy allowing performance contracting arrangements in federal facilities, and define policy guidelines when to implement it. In addition, goals should be established for achieving all the cost-effective savings opportunities in all federal facilities by a specified date.

The Alliance recommends that builders, real estate agents and others with interest in home buying and residential conservation learn of these new lending programs and educate homebuyers about them. These loan programs can improve housing affordability, benefiting consumers and business.

Encouraging and Assisting Electric Utilities To Conduct Least-Cost Planning

The last major need we have identified is more narrowly targeted to one segement of the energy producing industry, but is of growing concern. It is of interest to individual utilities, state public service commissions and others. As I noted, utilities can play an important role in providing information and the delivery of energy conservation services. Nearly every major electric utility offers conservation programs to its customers. Some programs, like the Residential Conservation Service, are required by law. Others, such as rebates for purchasing energy-efficient products, are offered by utilities because they help achieve utility goals of limiting growth in peak demand or deferring new capacity additions.

In a recently completed study we found, however, that utility support for conservation programs is generally determined on an ad-hoc basis. Only 8 of the 36 organizations we surveyed have done a comprehensive analysis of the role for conservation in the formulation of a least cost strategy. In a current study we are conducting sponsored by General Public Utilities, we are developing a least-cost framework and methodology for utilities to use to assess both the total potential for electricity savings in their service territories and the optimal level of resources they should commit to conservation programs.

Innovative projects have begun at many governmental levels. Several state governments, most recently Michigan, have begun to investigate least-cost planning on a state-wide basis. The state of Michigan will be exploring future business growth and its impact on electricity demand, current and planned generating capacity, and the opportunity for electricity savings in all sectors, in order to develop a long range least-cost energy plan for the state.

Another innovative project was the regional planning process in the Pacific Northwest, prompted by the Pacific Northwest Power Act. It was a difficult, but productive, exercise. In our survey review, we found the least-cost methodologies developed and used by the Bonneville Power Administration among the most advanced. A report by the Department of Energy Electricity Policy Task Force, evaluating the lessons learned from this experience and the applicability of regional planning to other areas of the country, would facilitate consideration of the issue.

Finally, perhaps the Congress and Administration have taken no more innovative approaches to industry over the past few years than the deregulation of major portions of the economy. The airline and telecommunications industries all have changed significantly since the passage of deregulation. The effects have been dramatic - some of them anticipated, others not. The deregulation of the transmission from generation of electricity has been increasingly discussed as a policy option to promote least-cost electric services. A report by the Department of Energy's Electricity Policy Task Force evaluating the viability and consequences of such a change would be valuable to begin framing the discussion.

Recommendations:

There are several actions the federal government and the private sector can initiate to encourage and assist states and utilities in least-cost planning. We recommend this committee consider the following actions:

o Instruct the Department of Energy to develop and transfer information on state-of-the-art least-cost planning methodologies to state energy offices and public service commissions.

o Require DOE's Electric Policy Task Force to review and report upon the viability and implications of (a) voluntary regional planning throughout the country - with particular attention paid to the lessons learned from the Pacific Northwest Power Planning Act, and (b) the deregulation of the generation from the transmission of electricity.

SUMMARY

I have presented what the Alliance perceives as major impediments - and possible solutions - to continued progress in energy efficiency. By no means have I discussed all the innovative projects, individual needs or possible programs in each energy use sector. We hope this testimony will serve to focus debate, prompt action and renew momentum toward an energy-efficient economy.

Thank you for the opportunity to testify. I am pleased to answer any questions the Committee may have.

Senator Evans. Thank you very much.
Mr. Bozich.

STATEMENT OF HOWARD BOZICH, PRESIDENT, IMPACT MANAGEMENT SYSTEMS AND ENERGY SERVICES CO., PAST PRESIDENT, NATIONAL ASSOCIATION OF ENERGY SERVICE COMPANIES

Mr. Bozich. Good morning, Senator Evans. My name is Howard Bozich. I am the president of Impact Management Systems and Energy Service Co. and the past president of the National Association of Energy Service Companies.

The National Association of Energy Service Companies or NAESCo is a 2-year-old organization which represents the energy performance contracting industry in this country. It is composed of three basic groups. The first group is energy services companies who design, install, and finance energy conservation projects and guarantee the customer some level of energy savings.

The second group in NAESCo is composed of public sector members, mostly State energy officials who are providing information, education, and technical assistance to potential buyers of energy services contracts.

The third group is made up of people in the conservation industry who have been around for a long time, specifically engineers, equipment managers, financial sources, and other people who provide some specialized portion of the energy conservation package.

The customer base that shared savings or performance contracting deals with is very wide. It includes all public sector, commercial, and industrial facilities. There has been particular growth in the past 2 years in the public sector. School systems, city, and State facilities have started to take on shared savings or performance contracting in greater and greater numbers. States have helped facilitate this by passing long-term contract laws. New York, Ohio, and New Jersey are just a few examples.

A number of requests for proposal are now on the streets from a wide variety of States—Massachusetts in the north, California and Washington in the west, and Mississippi and Florida in the south.

Performance contracts offer clients in the country a number of advantages in controlling energy conservation. First is the assumption of performance risk by the energy services company. Selecting and implementing effective conservation strategies is laden with pitfalls. The project that fails to deliver expected savings becomes not only a bad investment, but a poor conservation effort.

When an experienced ESCos is willing to bear these risks, energy consumers feel more confident in undertaking conservation projects. Successful ESCos have found that one of the most reliable ways to predict and deliver energy performance levels is to design more comprehensive projects that involve a wider variety and larger number of energy conservation measures, which in turn produce a larger amount of savings and require longer paybacks and a greater investment.

The second advantage offered by energy services companies is financing. ESCos are capable of providing customers all of the upfront cash to design and install the project.

The third advantage is an incentive for more extensive efficiency improvements. The nature of the performance contract is an incentive to larger, long-term conservation results. The resulting renovations and capital improvements often become a primary motivation for customers entering these kinds of contracts.

The fourth advantage is the long-term commitment to the project. Most contracts guarantee performance from 5 to 15 years. An obligation by the ESCos for monitoring and maintaining the project is a great incentive for many customers.

Public energy officials are developing model procurement procedures, requests for proposals, evaluation tools, drafting local legislation for long-term contracts. We believe that these officials play an important role in promoting and guiding performance contracting. We believe that our industry is making a major contribution to national energy efficiency. Our association places great emphasis on working with public energy officials to maximize our impact, direct our efforts, and improve our quality.

We ask for congressional support in three ways. First, continue to provide adequate funding to Federal and State energy programs which facilitate the development of performance contracting.

Second, create long-term contracting capability by the Federal Government so that our industry can provide conservation to Federal facilities.

And third, we ask that all regulatory and tax legislation be designed so as not to discriminate against our industry. And we are looking for particular assistance here in transition roles as we move away from being a tax incentivized industry to a straight economic industry.

Thank you. I am ready for any questions.

[The prepared statement of Mr. Bozich follows:]

NAESCO

2300 M Street, N.W.
Washington, D.C. 20037
202/955-9795

TESTIMONY BEFORE THE SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION OF THE COMMITTEE ON ENERGY AND NATURAL RESOURCES- UNITED STATES SENATE

FRIDAY, OCTOBER 18, 1985
BY HOWARD BOZICH
NAESCO PRESIDENT

NATIONAL ASSOCIATION OF ENERGY SERVICE COMPANIES

MAKE-UP OF NAESCO:

The National Association of Energy Service Companies (NAESCo) is a 2-year old organization which represents the Energy Performance Contracting Industry in this Country. It is composed of three basic groups that work together to make up the industry.

The first group is the Energy Service Companies (ESCos). ESCos design, install, maintain and finance energy conservation and alternative energy projects and guarantee the customer some level of energy savings. It is this guarantee of savings that makes ESCos performance contractors.

The second group in NAESCo is the Public Sector members. This group is represented by Federal, State and Local energy officials whose primary role is to promote and facilitate performance contracting as a major strategy and resource for achieving energy conservation goals.

The third group is made up of equipment manufacturers, energy engineers, installation contractors, maintenance contractors, financing sources and insurance companies; all supplying specialized services to ESCos in order to implement a project.

ABILITY TO MEET CONSERVATION GOALS:

Clients for these services include public schools, city and county buildings, colleges and universities, hospitals, nursing homes, correction facilities, public housing, commercial and industrial facilities. We look forward to including buildings owned by the Federal Government on our list when long term contracting legislation is passed and reasonable procurement procedures are developed.

ESCo performance contracts offer clients and the country, a number of advantages in controlling energy consumption. First, is the assumption of performance risk by the ESCo. Selecting and implementing effective conservation strategies is laden with pitfalls. A project that fails to deliver expected savings becomes not only a bad investment, but a poor conservation effort. When an experienced ESCo is willing to bear these risks, energy consumers feel more confident in undertaking conservation projects.

Successful ESCos have found that one of the most reliable ways to predict and deliver performance levels is to design more comprehensive projects that involve a wider variety and larger number of Energy Conservation Measures (ECMs) which, in turn, produce a larger amount of savings. These comprehensive programs have longer paybacks and also require greater investment.

The second advantage offered by ESCo projects is financing. ESCos are capable of providing customers all the up-front cash to design and install a project. More ESCo financing is now offered in a more conventional form, such as leases and lease-purchase agreements rather than the "creative" types of financing which were dependent upon tax credits and accelerated depreciation. IRS rulings and congressional moves to restrict availability of these tax breaks have shifted the marketing of ESCo services from a finance alternative to the performance guarantee.

The third advantage is a true performance contractor has an incentive to do more extensive efficiency improvements. For example, a technical approach that replaces obsolete or poorly maintained heating equipment and windows, produces more savings and greater reliability for a longer period of time than a strategy of only Heating Ventilating and Air Conditioning (HVAC) controls. The nature of the performance contract is an incentive to larger, long term conservation results. The resulting renovations and capital improvements often became a primary motivation for a customer to proceed with a contract.

The fourth advantage is the long term commitment to the project. Most contracts guarantee performance for 5 to 15 years. One of the standard features is an obligation by the ESCo for monitoring and maintaining the project. Not only does this enable the ESCo to assure savings, but provides the customer with additional highly skilled maintenance personnel.

We are beginning to see that this long term commitment by ESCos generates interest in ongoing consultation with customers about energy and operation problems; even those not related to the ESCo project.

RELATIONSHIP OF INDUSTRY PLAYERS:

Energy preformance contracting is a networking industry. Government energy officials facilitate contracts by providing prospective customers information and technical assistance. This is important because it increases awareness of conservation benefits to energy users. The information also shows users there is a credible, low risk, high benefit approach to conservation through energy performance contracts.

Public energy officials are developing model procurement procedures, Requests for Proposals, evaluation tools, and drafting local legislation for long term contracts. We believe these officials play an important role in promoting and guiding performance contracting. We, therefore, urge you to protect these efforts in future appropriations for Federal and State energy programs, because they provide a large opportunity in meeting national conservation and modernization objectives at a low cost to government.

ESCos work with public officials in the education development and procurement process so that our industry can deliver the results to meet major Federal, State and Local conservation goals.

ESCos primarily market, design, and coordinate subcontractors in the implementation of projects. This project design and coordination enables the ESCo to provide the expertise, experience and control needed to guarantee performance.

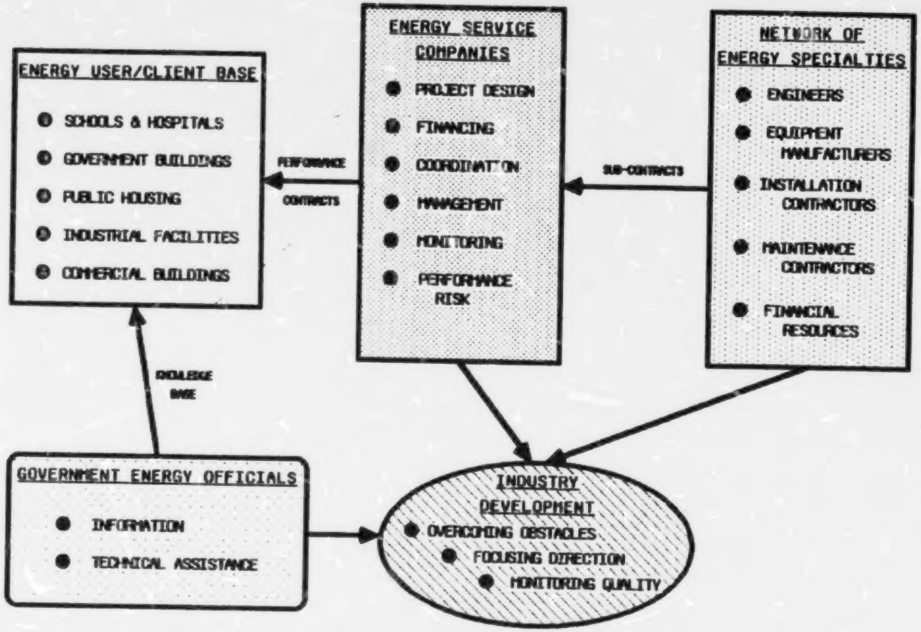
From an investment perspective, the greatest dollar amount goes to equipment and material manufacturers and engineers. Our industry includes a large number of small companies offering specialized products and services. Because of the marketable and comprehensive nature of performance contracting, new opportunities are available to these firms through the ESCo delivery system.

We believe the energy performance contracting industry is making a major contribution to national energy efficiency. Our Association places great emphasis on working with public energy officials to maximize our impact, direct our efforts and improve our quality.

CONGRESSIONAL SUPPORT:

We ask for congressional support in three ways. **First**, continue to provide adequate funding to Federal and State energy programs which will facilitate the development of performance contracting. **Second**, create long term contracting capability by the Federal Government, and supplement that with good procurement practices. I recommend you look to states involved in this process for guidance in how to begin Federal implementation. **Third**, we ask that all regulatory and tax legislation be designed so as not to discriminate against our industry.

ENERGY PERFORMANCE CONTRACTING



ENERGY USER/CLIENT BASE
- SCHOOLS & HOSPITALS
- GOVERNMENT BUILDINGS
- PUBLIC HOUSING
- INDUSTRIAL FACILITIES
- COMMERCIAL BUILDINGS

ENERGY SERVICE COMPANIES
- PROJECT DESIGN
- FINANCING
- COORDINATION
- MANAGEMENT
- MONITORING
- PERFORMANCE RISK

NETWORK OF ENERGY SPECIALTIES
- ENGINEERS
- EQUIPMENT MANUFACTURERS
- INSTALLATION CONTRACTORS
- MAINTENANCE CONTRACTORS
- FINANCIAL RESOURCES

GOVERNMENT ENERGY OFFICIALS
- INFORMATION
- TECHNICAL ASSISTANCE

INDUSTRY DEVELOPMENT
- OVERCOMING OBSTACLES
- FOCUSING DIRECTION
- MONITORING QUALITY

NAESCO

Senator **Evans**. Thank you.

Well, first, are you—either one of you or both of you—satisfied with the current legislation that is now going through Congress that will allow for multiyear contracting from Federal agencies? Does it appear to be adequate to do the job?

Mr. **Bozich**. Yes.

Senator **Evans**. I hope that you will be available and be actively engaged at the next step. Assuming that this passes, we obviously then will have to write some regulations. And often—let me emphasize "often"—there's a big slip between the concept of legislation and the kind of regulations that are written.

Mr. **Bozich**. The document that I submitted this morning indicated that we hope that you look to the States for guidance in some of this regulation. They've found how to do it quite well.

Senator **Evans**. I certainly, to the degree I can, will urge that the Department of Energy do so. And I expect that as they get into the regulation writing, that you will—I hope that you'll be very active and the States will be as well, to ensure that it's as simple and straightforward as it can be.

Mr. **Wolf**. Senator Evans, there also is a public sector advisory board to NAESCo, which this year I am the chairman of. And Ms. Burman from Washington State is on it, as well as others, and we'll be very actively involved with that process.

Senator **Evans**. Good.

You mentioned also, Jim, the Public Utility Holding Company Act in some respects may prevent shared savings program. Could you elaborate a little on that?

Mr. **Wolf**. It's particularly the type of activities utilities engage in outside of their service territory. And many utilities question whether they want to do it within their service territory; others only want to do it outside of their service territory.

Again, it's another example of regulation that clearly has been overtaken by both technological, and I guess, financial developments. A utility has somewhat, or may have somewhat, mixed feelings about having an energy service company operating as an unregulated subsidiary, candidly, losing some of its load. And so some utilities would like to do this outside of their service territory; others seeing it as complementing their strategies within their service territory.

Senator **Evans**. The current act does, then, prohibit the utility from running an unregulated subsidiary outside their service territory?

Mr. **Wolf**. No. It doesn't prohibit them. But there are restrictions on it. I believe there has to be a filing with the SEC and other requirements have to be met, and many of them just will not go through that process.

Senator **Evans**. I couldn't pass up the chance to comment on something you said that was similar to what was said earlier about providing incentives for those energy managers. Otherwise they won't go ahead with doing it—which I still find puzzling.

It would seem to me, if I was an energy manager in the company, what I'd want to do is do the best job I could to reach out, whether it's outside shared energy savings or any other way to reduce the energy cost. That kind of performance is what gets you out of the job; you're going to be the vice president in charge of something.

Mr. **Wolf**. I was very surprised as well, Senator, and somewhat disappointed. But again, recently, I addressed the national trade association of one of the major industries; 150 energy managers were there, and some of them were off the record, candidly saying, you know, we want our own energy engineers. I want to supervise my own people. And they candidly view the energy service firm coming in as somewhat of a threat to their expertise and almost private fiefdom.

Mr. **Bozich**. Our company specializes in the public sector and we don't quite see that same thing happening there. As public sector, school districts, et cetera, get involved in performance contracting, often what their technical people are looking for is assistance in renovation of their facilities, new boilers, things that have become obsolete as well as inefficient.

And it's when the energy services company goes that extra step and creates a greater investment and greater impact, and includes renovation, that they can see additional benefits. In fact, their jobs then become easier. It's easier to control the temperature, the facility operates better, they have fewer headaches and fewer ulcers. And it's when energy services companies dig in deeper and really try and understand their customers that in fact that problem can be overcome, at least in the public sector.

Senator **Evans**. In your experience, what's the largest performance contracting contract that anyone has dealt with up to date? How big can these get? You heard my question of the previous panel on that, whether, for instance, someone like Kaiser could reach out, or whether anybody would be out there that would be willing to finance something like that.

Mr. **Wolf**. Broadly defined, performance contracting not only includes share the savings, but other types of guaranteed leasing.

Bethlehem Steel, for example, financed a continuous caster on somewhat of a performance contracting basis up in Baltimore, and that was a several-hundred-million-dollar deal.

Senator **Evans**. When you say Bethlehem financed, you mean they financed for their own——

Mr. **Wolf**. Their own facility.

Senator **Evans**. For their own facility.

No, that's not quite what I had in mind, I guess. That happens all the time. People finally get to the point where they realize that, on balance, this is a good investment of their own capital.

Mr. **Wolf**. No; I'm sorry, Senator. They did not invest their own funds. They got outside investment banking funds to finance the continuous caster in their facility. And the investors are being paid back on a performance contract basis.

Senator **Evans**. OK. All right. So that is—how large was that?

Mr. **Wolf**. It was a several-hundred-million-dollar continuous caster. I don't know the absolute amount.

Senator **Evans**. So the potential is there. At least companies have to take a look at it if the alternative is not doing it. And I suppose if they did it, if they figured they could do it with their own funds, there might be a somewhat bigger reward; but if they haven't got their own funds, that's not a high enough priority for the limited funds they've got; here's a way to multiply the availability of funds.

Are there other examples that you're aware of, Mr. Bozich, especially through the energy service companies?

Mr. BOZICH. Through the energy services in the public sector—and I'm not aware of the private sector—they're a little bit more secretive, I think—in the public sector there are a number of contracts now in the $3 million range. The University of Rhode Island—I think there's a project in the State of Massachusetts, a couple in the State of Pennsylvania, the city of Chicago.

Senator EVANS. Are those generally a contract covering—just sort of a broad contract covering multiplicity of buildings and areas?

Mr. BOZICH. They usually include multiple buildings and multiple technologies.

Senator EVANS. What are the current problems and potential as far as the energy service company industry is concerned? Where do you think you are now at this point in terms of just general credibility and understanding of what it is you do from the owners and managers out there?

Mr. BOZICH. Well, just a couple of bases to kind of compare from. In terms of the reaction that we had from the public sector advisory board at our NAESCo Conference this year as compared to last year, last year what the public sector folks told us, energy services companies is, credibility is your biggest problem. And come up with some ways to handle that issue.

This year we came back with so many ways to handle that issue that they told us to quit acting like government and quit trying to regulate ourselves. So, that I think that a certain amount of trust has at least been built up in people that are familiar with our industry at the State level particularly.

I think a second thing that is helping our credibility is the Federal Government's reduction in tax credits. I think the biggest credibility problems that our industry has had has come from abuse of tax credits. People that have created projects basically to take advantage of investment tax credits and accelerated depreciation, with little or no knowledge of conservation per se, is those kinds of things are disappearing.

There are fewer companies in the industry, but the players that are left in the industry are those that are really committed to creating strong, high performance, economical projects. So I think those two things, just our relationship with the public sector and the change in tax laws has helped our credibility a great deal in the last year.

Senator EVANS. Jim, given the dramatic changes which have occurred in the course of the last 12 or 13 years from the time of the first oil crisis and sharp increase in energy prices, and now the steady and fairly extended decline in prices, what's your current feeling about end-user attitudes toward these energy conservation measures, and what do we need to do about it?

Mr. WOLF. Well, as I detailed, the end-user attitude is unfortunately one of severe complacency, and I think that permeates all energy sectors, whether it's the homeowner or the industrial manager. Perhaps, even as Howard said, a lesser extent, the institutional sector where they're still driven by budgetary constraints.

The opportunities are still there, and I think that's important for Government particularly to emphasize as part of its educational programs, even with declining energy prices, as a very, very sound economic investment. That message must be gotten across again to all end-use sectors.

I think it's important that the Government demonstate a leadership role and that it again pursue long-term planning and encourage others to do that. That would be our recommendations, along with the others detailed in my testimony.

Senator EVANS. Let me ask one last perhaps unfair question that I should have asked of everybody as they came by. But we draw a scenario of an increasing economy, a rapid increase in some Third World developing economies. I spent some time in China during August and it's quite obvious that they are finally perched on the edge of a very rapid industrialization and growth. Their goal, and I wouldn't downgrade their goal, is to be an industrialized nation like the United States in 50 years. That boggles the mind, having a billion people with the use of resources at the same level we're using them.

With all of that, we're dealing in energy with many nonrenewable resources, particularly petroleum and natural gas energy; now we have a declining interest because of declining prices in energy conservation. Should we send a sharp signal by a 50-cent gasoline tax, as someone suggested?

Mr. BOZICH. I think some taxes on perhaps imported oil might at least help keep an awareness level up. I think our industry has learned how to not necessarily look to the Government to help us get the job done, but to turn inward to try and find out what we have to do to make conservation something that people want to buy. And certainly performance contracting seems to be something that a number of people from all the various specialties of this industry have kind of come to the same table at, and said, look, this is the way that we can, as an industry, continue to promote and sell and get conservation happening in this country.

I don't know that we need any particular government help right now to do that, other than the help that we're getting with our relationship with the public sector members in NAESCo who are providing information and education.

Right now they're doing a very good job.

Mr. WOLF. Senator, I would just point out, without taking a position on an oil import fee, that even when it's being talked about here in Washington, the signals sent out to the country or the reason it's being talked about is because of the deficit problem primarily. In fact, because energy prices are low, that's why maybe perhaps we should consider an oil import fee.

And that is indeed reinforcing the perception out there that energy conservation is not a priority at the current time.

Senator EVANS. The predictions in looking ahead are that we will be back in the field of growing imports of petroleum products very shortly. Before too many years, we'll be up to fairly dangerous levels again.

The question is, obviously, the best way to avoid that is through intensive continued effort on that conservation side, because we certainly don't seem to be making it very well on the production side. It hasn't been very good recently—major new discoveries.

Well, thank you all for a hearing that's been very interesting and a helpful hearing. For each of the witnesses, we may have other questions we'd like to submit to you for written response for the record. And we'll have to examine and determine from this oversight hearing whether any legislation or further action is desired by the committee.

With that, we are adjourned.

[Whereupon, at 12:15 p.m., the hearing was adjourned.]

APPENDIX

Responses From the Department of Energy to Additional Committee Questions

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Department of Energy
Washington, DC 20585

November 8, 1985

Honorable Don Nickles
Chairman, Subcommittee on Energy
Regulation and Conservation
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

On October 18, 1985, Alan Streb, Deputy Assistant Secretary for Conservation, and Frank Stewart, Director of the Office of State and Local Assistance Programs, appeared before the Energy and Natural Resources Subcommittee on Energy Regulation and Conservation to discuss innovative approaches in industrial energy efficiency.

Following that hearing, you submitted two Sets of written questions for our response to supplement the record. Enclosed for your information are the answers to Set I of the questions, which also have been sent directly to the Committee staff. Our response to Set II of the questions will follow shortly.

If you have any questions, please have your staff call Ingrid Nelson or Cathy Hamilton on 252-4277. They will be happy to assist.

Sincerely,

Robert G. Rabben
Assistant General Counsel
for Legislation

Enclosure

POST HEARING QUESTIONS AND ANSWERS

RELATING TO THE HEARING ON

OCTOBER 18, 1985

BEFORE THE

SUBCOMMITTEE ON ENERGY REGULATIONS AND CONSERVATION

COMMITTEE ON ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

WITNESSES: ALAN J. STREB AND FRANK STEWART

QUESTION FROM SENATOR NICKLES

Question: What is the current status of the Energy Efficiency Improvement Program authorized under EPCA?

Answer: Corporations using over a trillion Btu's per year, within any 2-digit Standard Industrial Classification, continue to report to DOE on energy efficiency improvement. Industry reports are due each June and are submitted either directly or through an approved third party sponsor. Information is assimilated, analyzed, and published annually by DOE. The report on calendar year 1984 efficiency improvement is currently being developed and publication is anticipated by January 1986. Required information on recovered materials utilization is also published each year for four industries.

The Department of Energy's present position is that continuation of the industrial energy efficiency reporting program is not necessary, as the cost of administering it outweighs the energy conservation benefits. In addition, large corporations have considerable economic self interest in continuing to monitor their own energy consumption without the requirement of federal reporting. In a September 18 letter to Senator McClure, Dr. Merklein of EIA proposed working with the staff of the Energy & Natural Resources Committee to develop legislation to repeal this reporting program. Until such legislation is enacted, however, the Department will continue its administration.

QUESTIONS FROM SENATOR NICKLES

Question:	Could you briefly describe any legislative initiatives that the Department is currently working on.
Answer:	Department staff has worked with Committee staffs in both the Senate and House on legislative initiatives by the Committees which would permit Federal agencies to enter into multi-year shared-savings contracts with private sector firms willing to finance in part certain energy savings investments in Federal buildings. In answer to a subsequent question, DOE suggests relatively minor modifications to the language of the shared-savings bill adopted by the Senate Energy and Natural Resources Committee.

Beyond the shared-savings provisions, the Federal Energy Management Program (FEMP) staff and energy coordinators from other Federal agencies have met informally with the staffs of the appropriate Senate and House committees to discuss other revisions to the National Energy Conservation Policy Act (NECPA). Among the NECPA changes which the Federal agencies are seeking are these: (1) establishment of a new energy consumption goal that requires agencies to reduce the energy consumed in Federal building by 10 percent by 1995 over 1985 levels as measured on a Btu per square foot basis; (2) elimination of the impractical requirement for the complete retrofit of all Federal buildings by 1990 to minimize their life-cycle cost; and (3) replacement of the current requirements that marginal fuel costs and fixed discount rates be used in life-cycle cost (LCC) calculations with provisions that agencies use average costs in their LCC analyses and DOE update and publish annually the discount rate and other variables to more accurately reflect changes in the economy. The Office of Management and Budget (OMB) has been apprised of these proposed revisions and of the discussions with Committees' staff.

QUESTION FROM SENATOR NICKLES

Question: I understand that the research officers of many of the Nation's aluminum companies are currently in Washington, D.C. to visit with DOE officials. Using this as an example, could you please describe the objectives of such exchanges?

Answer: DOE's Office of Industrial Programs hosted a meeting on October 17 and 18, which was attended by 23 representatives of the aluminum industry. The primary objectives of this meeting were:

- o transfer of technical information derived from DOE/Industry cost-shared R&D projects with Alcoa, Kaiser and Martin-Marietta, as well as the DOE-sponsored research at Battelle's Pacific Northwest Laboratories and the Massachusetts Institute of Technology. This technology transfer was aimed at the U.S. aluminum industry. All of the major U.S. aluminum companies had technical representatives in attendance.
- o outlining of DOE's role in continued support of R&D on aluminum processes.

- discussion of information transferred and DOE's program plans, and

- gaining information on the general nature of research being undertaken by industry.

QUESTION FROM SENATOR NICKLES

Question: I understand that the Department currently obtains its industrial energy data from a data form known as the "CE-189" which was authorized by Title III, Part E of the Energy Policy and Conservation Act. Is this data useful?

Answer: CE-189 data are useful in that they provide information on the progress of large energy-consuming industries toward improved energy efficiency. However, the utility of the data is limited to providing general information on trends within major industry groups.

Respondents to the CE-189 include only large corporations consuming one trillion Btu per year or more in a single major industry group, designated by a two-digit Standard Industrial Classification (SIC). This coverage, while it captures much of the energy consumption by the more energy-intensive industries, falls short of complete or representative coverage in other sectors, as explained in the subsequent answer. The EIA has compared consumption estimates from the CE-189 to data (available through 1981) from the "Fuels and Electric Energy Consumed" supplement to the Census Bureau's Annual Survey of Manufactures (ASM). Comparisons of the data from these two surveys at the two-digit SIC level reveal considerable differences that vary from industry to industry and from year to year.

QUESTION FROM SENATOR NICKLES

Question: Hasn't the Administrator of the Energy Information Administration proposed to replace the CE-189 with a new survey known as the Manufacturing Energy Consumption Survey or "MECS"?

Answer: Yes. Attached for the record is a letter from the EIA Administrator, Dr. H. A. Merklein, to the Senate Committee on Energy and Natural Resources and the House Committee on Energy and Commerce explaining the advantage of the MECS and the rationale for the elimination of the CE-189. Also attached for the record is a comparison of the two data collection efforts.

Department of Energy
Washington, DC 20585

SEP 18 1985

Honorable James A. McClure
Chairman, Committee on Energy
  and Natural Resources
United States Senate
Washington, D. C. 20510

Dear Mr. Chairman:

I am writing to advise you of the current status of the Energy Information Administration's (EIA) proposed Manufacturing Energy Consumption Survey (MECS) and to express the Department's concerns regarding the duplication between this survey and the Energy Efficiency Improvement Program (Form CE-189).

To bring you up to date on MECS, we have requested clearance from the Office of Management and Budget (OMB) for a MECS pilot survey. We expect to receive word from OMB on the clearance of the pilot questionnaire by October 25, 1985. If the form is approved, the pilot test would involve no more than 100 respondents. The results of the pilot would help EIA to make any necessary revisions to the data-collection form and instructions. The final MECS form would be submitted for OMB approval by January 1986. The first full-scale MECS would be fielded between April and June of that year and would gather data for calendar year 1985. The Census Bureau would act as EIA's data collection agent for MECS.

The Energy Efficiency Improvement Program, established by Part E of Title III of the Energy Policy and Conservation Act, is an annual survey which collects data on energy consumption from large corporations. Both industry and government recognize that consumption data similar to those that will be produced from the MECS are being collected by the Energy Efficiency Improvement Program on Form CE-189. As we have discussed with Committee staff, manufacturers have expressed considerable concern with respect to the duplication between these two data collection surveys. Less well known and little understood, however, is that, because of the way the two surveys are designed, the MECS is better able to achieve the goal of providing data that are usable for analyzing the consumption of energy in manufacturing.

Respondents to the CE-189 include only large corporations consuming one trillion Btu per year or more in a single major industry group, designated by a two-digit Standard Industrial

Classification (SIC). This coverage, while it captures much of the energy consumption by the more energy-intensive industries, falls short of complete or representative coverage in other sectors. The EIA has compared consumption estimates from the CE-189 to data (available through 1981) from the "Fuels and Electric Energy Consumed" supplement to the Census Bureau's Annual Survey of Manufactures (ASM). Comparisons of the data from these two surveys at the two-digit SIC level reveal considerable differences that vary from industry to industry and from year to year. Therefore, the information that the CE-189 survey yields is not (and was never intended to be) a comprehensive data base on the consumption of energy in the manufacturing sector. In addition, the way the CE-189 data are collected precludes any geographic breakdown of the information, (e.g., by region of the country), and makes it impossible to measure consumption in important subsectors of industry, such as differentiating between the energy-intensive industries of steel and aluminum.

In contrast to the CE-189, the MECS would obtain statistically reliable information from a sample of all manufacturing establishments on a triennial basis. This information could be disaggregated geographically and by major energy-consuming subsectors. In addition, the average annual burden of MECS is expected to be less than CE-189.

As well as supporting statistically reliable publications, MECS could be used to produce measures of energy efficiency that would serve the same purposes as those now presented in the "Annual Report to the Congress and the President on Industrial Energy Efficiency Improvement 1983". Such measures would be based on energy consumption data collected by MECS and economic data collected by the ASM on value of shipments or value added. For the years in which the MECS is not fielded, ASM data on total fuels consumed and value added or value of shipments (in constant dollars) could be apportioned to various SIC's, based on the most recent MECS data, to estimate these measures.

In view of the advantages of MECS and the shortcomings of the CE-189, and in the interest of reducing the reporting burden on industry, the Department of Energy proposes that CE-189 be eliminated. Regardless of whether or not OMB approves MECS, we have been informed by OMB that there is no objection to eliminating CE-189 from the point of view of the Administration's program.

At this point, the best legislative route for accomplishing the elimination of the CE-189 program is unclear. I would be happy to work with you to develop the legislative language and to identify the appropriate vehicle for eliminating this requirement. David Montgomery of my staff will be in contact with Committee staff to assist in resolving the issues associated with the proposed elimination of the CE-189 program.

Sincerely,

H.A. Merklein

Dr. H. A. Merklein
Administrator
Energy Information Administration

cc: Honorable J. Bennett Johnston
Ranking Minority Member

Honorable James A. McClure
Chairman, Subcommittee on Interior
and Related Agencies
Committee on Appropriations

Honorable Robert C. Byrd
Ranking Minority Member
Subcommittee on Interior
and Related Agencies
Committee on Appropriations

October 22, 1985

Comparison Between

The Proposed Manufacturing Energy Consumption Survey, Form EIA-846 and The Energy Efficiency Improvement Program, Form CE-189

	EIA-846(MECS)	CE-189
1. Target population	All manufacturing establishments in the U.S. with 5 or more employees (approximately 225,000).	All manufacturing corporations which consume at least one trillion BTU of energy per year in any 2-digit SIC (about 700 corporations representing approximately 15,000 establishments.)
2. Method of data collection	National probability sample of 12,000 establishments.	Census of eligible corporations as defined in (1) above.
3. Unit of collection	Manufacturing establishment at a single physical location.	Any establishment with production in an eligible 2-digit SIC category as defined in (1) above.
4. Fuel consumption data	Total by energy source for entire establishment.	Total by energy source only for eligible 2-digit SICs within establishment as defined in (1) above.
5. Energy throughput data collected	Data on purchased energy sources, on-site production of energy sources, fuel consumption, and feedstock consumption	Fuel consumption data.
6. Expenditures data	Yes	No
7. Fuel-switching data	Yes	No
8. Storage capacity data	Yes	No

Comparison Between Form EIA-846 and CE-189

9. Byproduct fuel data	Yes, identified separately.	Yes, but combined with all other consumption of that energy source.
10. On-site electricity generation and cogeneration data	Yes	No
11. Feedstock data	Total by feedstock-type for entire establishment.	No feedstock data collected.
12. Waste materials fuel data	Total by type of waste material for entire establishment.	No waste material fuels data collected.
13. National two-digit SIC consumption	Yes	Yes, but coverage more complete for some 2-digit SICs than for others. (Ranges from 20 percent to 90+ percent coverage)
14. Regional estimates available	Yes	No. Data are aggregated by corporation and then by trade associations to national 2-digit SIC totals.
15. Detailed industry (3- and 4-digit SIC) consumption data available	Yes, but limited to those which are the most energy-intensive.	No. See (14) above.
16. Conservation indices available	Yes, using energy consumption per deflated dollar of value of shipments, with historical data from the Annual Survey of Manufactures (ASM) for comparison.	Yes, using energy consumption from current year and historic consumption per unit of production.
17. Frequency of collection	Triennial	Annual
18. Estimated burden	48,000 hours, annual average	157,628 per year
19. Economic data	Yes, through linking with Bureau of Census ASM.	No

QUESTION FROM SENATOR NICKLES

Question: What are the advantages of MECS over the CE-189?

Answer: The information that the CE-189 survey produces does not (and was never intended to) amount to a comprehensive data base on the consumption of energy in the manufacturing sector. The MECS is being designed to produce such a statistically reliable, comprehensive data set. Certain key data elements included on the MECS are unavailable from the CE-189. These include energy expenditures, storage capacity, fuel switching capability, consumption of energy as a feedstock, and on-site electricity generation and cogeneration data.

In addition, the way the CE-189 data are collected precludes any geographic breakdown of the information, and makes it impossible to measure consumption in important subsectors of manufacturing, such as differentiating between the energy-intensive industries of steel and aluminum.

In contrast to the CE-189, the MECS would obtain statistically reliable information from a sample of all manufacturing establishments on a triennial basis. This information could be disaggregated geographically and by major energy-consuming subsectors. In addition, the average annual burden of MECS is expected to be less than CE-189.

QUESTION FROM SENATOR NICKLES

Question: Does DOE need new authority or legislative changes to carry out the MECS?

Answer: No. Sufficient legislative authority exists in Section 52 of the Federal Energy Administration Act of 1974 (Public Law 93-275) and the DOE Organization Act (Public Law 95-91) which mandate EIA's baseline energy information program.

QUESTION FROM SENATOR NICKLES

Question: Should all of Title III, Part E of EPCA be repealed, including the energy efficiency targets and the reports to Congress, or just those parts relating to the survey?

Answer: All of Title III, Part E of EPCA should be repealed. However, this is not to say that energy efficiency ratios similar to those calculated from the CE-189 data would be unavailable. In addition to producing statistically reliable energy data publications, MECS data could be used to produce measures of energy efficiency that would serve the same purpose as those now presented in the "Annual Report to the Congress and the President of Industrial Energy Efficiency Improvement 1983". Such measures would be based on energy consumption data collected by MECS and economic data collected by the ASM on value of shipments or value added. For the years in which the MECS is not fielded, ASM data on total fuels consumed and value added or value of shipments (in constant dollars) could be apportioned to various SIC's based on the most recent MECS data, to estimate these measures.

QUESTION FROM SENATOR NICKLES

Question: Is legislation required to assure that the Department will go forward with MECS?

Answer: No. The EIA will comply with the instructions to conduct the MECS contained in the report accompanying the FY 1985 appropriation for EIA. However, the Department of Energy and the Office of Management and Budget (OMB) agree that legislative action should be taken to eliminate the statutory requirement for the CE-189 program. Absent this elimination, the MECS will continue to be criticized as duplicative of the existing CE-189 data collection.

The EIA has received clearance from OMB for a pilot test of the MECS. The pilot will be fielded in November 1985 and will involve no more than 100 respondents. The purpose of the pilot survey is to test the data collection questionnaire and its accompanying instructions before fielding the first full-scale survey.

QUESTION FROM SENATOR NICKLES

Question: How would the MECS provide better protection for proprietary and confidential information?

Answer: EIA has entered into an interagency agreement with the Bureau of the Census to use the Bureau as its agent to conduct the MECS. The Census Bureau will collect these data pursuant to the authority provided in title 13, United States Code. Since section 9 of title 13 prohibits dissemination of individually identifiable data collected under this authority to persons outside the Bureau, the concerns of manufacturers about the confidentiality of these data should be allayed. Thus MECS data will have the same confidentiality protection afforded to all the other data collections which are conducted by the Bureau under the title 13 authority, such as the Annual Survey of Manufactures and the quinquennial Census of Manufactures.

QUESTION FROM SENATOR NICKLES

Question: The industrial energy efficiency improvement targets that were established under Section 374 of the Energy Policy and Conservation Act (EPCA) for 1980 have all been achieved, shouldn't new goals be established for the future?

Answer: Challenging goals are an important element of a sound energy management program. However, goals should be established by industry itself. Government can encourage the setting of efficiency improvement goals by industry, but should not be responsible for either developing or mandating such goals.

QUESTION FROM SENATOR NICKLES

Question: The Department's January 1984 Energy Conservation Technology R&D Program Plan states that an achievable industrial fuel savings by the year 2000 is about 6 quads or 20% of the 1982 energy usage. Does the Department continue to believe that this is an achievable target?

Answer: Although the 6 quads of achievable savings is 20% of the 1982 energy usage, it represents about 15% of the year 2000 projected energy usage of 39.6 quads. The Department believes that this is achievable in the industrial sector based upon the continuing interest among both energy consumers and their equipment suppliers in energy conserving innovations. The present fuel savings projection for the year 2000 of twenty-three technologies already developed and entering the marketplace is 1.5 quads.

QUESTIONS FROM SENATOR NICKLES

Question: Both the House and Senate have included language in their budget reconciliation legislation which would allow Federal agencies to enter into shared-savings contracts. Does the Department fully support these provisions?

Answer: The Department of Energy supports proposed legislation allowing Federal agencies to enter into multi-year shared savings contracts, but would suggest modifications of the language to provide greater detail on the contractor's responsibility to provide the initial capital costs of energy conservation measures in exchange for a share of any energy savings realized, and would broaden the definition of "energy savings" to include reduction in energy consumption caused by lease or purchase of equipment, supplies, or improvements. A version containing the suggested modifications is attached. (proposed changes to the Senate Committee bill are underlined).

A BILL

To (Fill in long title, which is a description of the bill).

BE IT ENACTED BY THE SENATE AND HOUSE OF REPRESENTATIVES OF THE UNITED STATES OF AMERICA IN CONGRESS ASSEMBLED, That this Act may be cited as the "Federal Energy Cost Reduction Act of 1985."

SEC. 2. Part 3 of title V of the National Energy Conservation Policy Act (P.L. 95-619) is amended by adding a new section after section 551 to read as follows:

"Sec. 552. Energy Savings Contracts. (a) Notwithstanding any other law, the head of a Federal agency may contract for energy savings for periods of not more than 25 years and shall provide in these contracts that the contractor shall incur the initial cost, or a portion of the cost, of implementing energy savings measures in exchange for a share of any savings resulting from such implementation. As used in this section "energy savings" means a reduction in the energy consumption or in the energy-related costs of an existing building or community of buildings caused by lease or purchase of equipment, supplies, or improvements; altered operation and maintenance; technical services; or other means or the increased efficient use of existing energy sources by cogeneration, heat recovery, or other means.

"(b) The costs of contracts authorized under this section for any year may be paid from monies made available to the agency for utilities costs and related operations and maintenance costs.

"(c) In the event funds are not made available for the continuance of a contract authorized by this section for a subsequent fiscal year, the contract shall be cancelled or terminated and the costs of cancellation or termination may be paid from--

"(1) funds appropriated for the performance of the contract concerned;

"(2) appropriated funds otherwise available for the payment of these costs; or

"(3) funds appropriated for these costs.

"(d) The Secretary's annual report under Section 550 and the information each Federal agency is required to furnish to the Secretary under Section 550 shall include -

"(1) a description of the progress made by each Federal agency in conforming its regulations to this section to permit contracts for energy savings, and

"(2) a description of each Federal agency's progress in the use of such contracts.".

SEC. 3. Section 101(b) of the National Energy Conservation Policy Act (the Table of Contents) is amended by adding a new item to read: "Sec. 552. Energy Savings Contracts.".

QUESTIONS FROM SENATOR NICKLES

Question: What is the Departments' estimate of the savings that can be achieved should these provisions be enacted?

Answer: Assuming that 440 retrofit projects are carried out from 1986 through 1995 under performance contracts, that each project averages a gross savings of $500,000 annually, that the split in the savings in the first year or two of the contracts is 80 percent to the contractor/20 percent to the government while changing to 50/50 in subsequent years and with 8 years assumed to be the average duration of contracts, the Federal government could save more than $360 million over the 10-year period. Of this total, nearly $100 million will be saved in 1995.

QUESTIONS FROM SENATOR NICKLES

Question:	Are you concerned that the Government may be giving away too much opportunity, that is, that we could achieve much of these savings, on our own, using our own funds and not have to share the savings with a contractor?
Answer:	Direct financing of retrofit projects could yield from 30 percent to 70 percent greater economic benefits to the Federal government than shared savings contracting, DOE studies indicate. However, the limited availability of Federal funds for energy conservation retrofits and the sizeable dimensions of the need - estimates have run as much as $3 billion - dictate that DOE and the Federal agencies pursue another approach. Shared savings contracting can save money and energy and is preferable to continuing the status quo.

QUESTION FROM SENATOR NICKLES

Question: Shared-savings and other performance contracting firms generally offer their services only to companies with large energy bills. What is DOE doing to help bring new conservation delivery mechanisms such as performance contracting to industrial and commercial firms with smaller energy bills?

Answer: As the providers of these services gain experience, the economically viable minimum size of such agreements will drop, and it can be expected that the services will be marketed to smaller energy consumers. This market may be particularly attractive to some of the smaller, newer energy service companies. DOE currently has no programs or initiatives whereby it directly promotes such conservation delivery mechanisms to industrial and commercial firms. However, there is an activity in the industrial energy conservation program for energy analysis and diagnostic centers (EADC's) which conduct energy audits for small and medium size firms via faculty and graduate students of 12 universities. The results can be used by the companies to assess the value of energy conservation delivery mechanisms.

QUESTIONS FROM SENATOR NICKLES

Question: What technical advice concerning Contractual Agreements, Measurement of Energy Savings, and other facets of performance contracting is DOE providing for schools and hospitals?

Answer: The Institutional Conservation Programs (ICP) provide grants (cost shared on a 50/50 basis in most cases) for technical audits of buildings owned by local governments, and public and private non-profit schools and hospitals, and for energy conservation improvements in buildings owned by schools and hospitals. The ICP grants have provided assistance for energy efficiency improvements in over 40,000 buildings during 7 funding cycles.

The first ICP innovative financing initiative began in 1982 with a proposal to perform a study/demonstration for institutional buildings similar to the one conducted by the Office of Building Energy Research and Development (now the Office of Buildings and Community Systems). This project is now under way, after DOE obtained the participation and co-sponsorship of the Urban Consortium's Energy Task Force Management Corporation. The emphasis of this project will be to show municipal and other local governments (and, by extension, other institutional building owners) how to successfully negotiate innovative financing arrangements. Because ICP grants cannot be made for energy efficiency improvements in local government buildings, there was particular concern that this sizeable building sector be encouraged to seek financing from innovative sources.

Subsequently, ICP has funded a number of other efforts to demonstrate the viability of innovative financing approaches both in general and for particular types of institutional buildings. These efforts include several studies of financing approaches appropriate to hospitals, and a demonstration including several colleges which are members of the United Negro College Fund. In addition, ICP and several States are working on a variety of initiatives to encourage institutions which have applied for, but not received, ICP grants, to seek alternative, innovative sources of funding for energy efficiency improvements.

These efforts have been designed to conform to the varying needs, sophistication, size, and resources of the target groups. But they have generally been planned to: (1) familiarize institutional building owners with various appropriate financing options; and (2) show these owners how to understand, plan for, evaluate, negotiate, and manage innovative financing arrangements. In addition, these projects will hopefully familiarize equipment and service providers with the unique problems and needs of institutional building owners.

QUESTIONS FROM SENATOR NICKLES

Question: What is the attitude of health care and other local administrators toward performance contracting?

Answer: Hospital administrators are interested in gaining access to capital through these types of financial arrangements. But, these arrangements are so complex that many are hesitant to begin the negotiating process.

The Department of Energy awarded a grant to the American Hospital Association for a Shared Savings study which is examining the extent to which hospitals are using shared savings, analyzing cash flows under various plans, and developing recommendations to stimulate the use of private shared savings funds to finance energy conservation. This study will be completed by March 1986, and the resultant recommendations should go a long way to familiarize administrators with the concept and acceptable arrangements, as well as giving them a starting point for their own negotiations for such plans.

QUESTION FROM SENATOR NICKLES

Question: What role do you forsee for Performance Contracting to reduce energy use in publicly owned low-income housing?

Answer: The publicly owned low-income housing sector will provide yet another potential market for performance contracting. The energy services industry has focused on those sectors that offer the highest margins of savings and return, namely, the industrial and institutional building sectors. DOE, through its Weatherization Assistance Program Innovative Financing Initiative, is exploring the performance contracting potential in privately-owned low-income buildings.

The Department of Housing and Urban Development's Building Technology Division, Office of Policy Development and Research, is presently conducting two demonstrations in non-profit section 202 housing for the elderly. HUD has also received authorization to try a demonstration in public housing. Although results of these demos are not complete, it is our belief that energy service companies - when operating in the residential sector - would find larger publicly owned projects as attractive as privately owned complexes if the regulations governing such arrangements are not burdensome or restrictive. I do believe, however, that the focus of performance contracting will continue to remain in the institutional and industrial sectors although there appears to be some interest in the multifamily sector - practicularly by smaller, newer energy service companies. Clearly, with over 12,000,000 households* living in multifamily dwellings of 5 or more units, the market is there.

*Residential Energy Consumption Survey, DOE, EIA, 1983.

Department of Energy
Washington, DC 20585

November 22, 1985

Honorable Don Nickles
Chairman, Subcommittee on Energy
Regulation and Conservation
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

On October 18, 1985, Alan Streb, Deputy Assistant Secretary for Conservation, and Frank Stewart, Director of the Office of State and Local Assistance Programs, appeared before the Energy and Natural Resources Subcommittee on Energy Regulation and Conservation to discuss innovative approaches in industrial energy efficiency.

Following that hearing, you submitted two Sets of written questions for our response to supplement the record. Enclosed for your information are the answers to Set II of the questions, which also have been sent directly to the Committee staff. This completes our response to your request as we forwarded answers to Set I of the questions on November 8.

If you have any questions, please have your staff call Ingrid Nelson or Cathy Hamilton on 252-4277. They will be happy to assist.

Sincerely,

Robert G. Rabben
Assistant General Counsel
for Legislation

Enclosure

POST HEARING QUESTIONS AND ANSWERS

RELATING TO THE HEARING ON

OCTOBER 18, 1985

BEFORE THE

SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION

COMMITTEE ON ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

WITNESSES: ALAN J. STREB AND FRANK STEWART

Question: What plans does DOE and in particular FEMP have to seek to have the regulations implementing the language on shared energy savings for Federal buildings, now contained in both the House and Senate Reconciliation bills, incorporated in the Federal Acquisition Regulations once the Reconciliation bill is enacted?

Answer: Once the legislation explicitly authorizing Federal agencies to enter into multi-year shared-savings contracts has been adopted, FEMP staff and representatives of the Department of Defense will meet again with staffs of the Civilian Agency Acquisition Council, Office of Federal Acquisition and Regulatory Policy at the General Services Administration and the Defense Acquisition Regulatory Council at the Pentagon to review possible changes that may be necessary in Federal Acquisition Regulations (FAR). Then as "pilot" shared-savings contracts are undertaken within the military services and in the civilian agencies and as questions regarding the effect of current procurement regulations arise, they will be referred to those responsible for developing the FARs for consideration in making changes.

Question: Could the rulemaking be expedited if the group who issues the Federal Acquisition Regulations would themselves initiate the rulemaking for shared energy savings authority instead of waiting for some other agency or Department to initiate them?

Answer: Any required rulemaking could be expedited if the groups which issue the Federal Acquisition Regulations would initiate the action; essentially this is what the FEMP staff will be seeking in their meetings with the Councils responsible for developing and modifying acquisition and procurement regulations.

Question: What specific plans does DOE and FEMP have to encourage Federal agencies to utilize the shared energy savings concept in Federal buildings once the language is enacted?

Answer: DOE, through FEMP, intends to use a series of presentations to educat and motivate Federal agency heads, including the individual military services, on the potential for utilizing shared energy contracts based on the final language contained in the Reconciliation bill. For those Federal agencies indicating an interest in the shared energy savings concept, FEMP will sponsor workshops designed to inform and gain the cooperation of these agencies' facilities operation personnel in implementing the shared energy savings concept on a pilot approach basis. FEMP will coordinate the implementation phase with the agencies' energy coordinators, identify and arrange for technical assistance as required, and be available for "over-the-shoulder" advice as needed.

Question: What could the OMB do to "encourage" all Federal agencies to utilize the shared energy savings authority for Federal buildings once that language is enacted?

Answer: OMB has been very supportive of FEMP's original efforts to get Federal agencies to initiate shared savings contracts as well as subsequent efforts to assure passage of the legislation permitting multi-year contracting.

Question: We are aware of one instance in which a shared energy savings company called homeowners and asked them questions about home and energy bills and told the homeowner that this was part of a DOE survey. That call was followed by another call in which the homeowner was told he can participate in a program sponsored by DOE which includes a free energy audit and a guaranteed 40% savings in energy bills by the homeowner if he accepts the services of the company. The program is called the "50/50" program.

Is DOE aware of any such representations by private companies of DOE sponsorship of their activities? How widespread are they? Is DOE sponsoring any such surveys or programs offered to consumers?

Answer: While DOE developed the 50/50 program concept and supported some limited analyses of its likely energy savings, the Department has not directly sponsored its implementation. Actual implementation of the program has been left to private companies interested in offering the program as a private service. A number of companies have offered the 50/50 program in many communities located in Northeast, Mid-Atlantic, and Mid-West states. Most of these local home contractors have offered the program under agreements with Sentinel Energy Savings Products Division of Packaging Industries Group, Inc., located in Hyannis,Massachusetts.

DOE has communicated to Sentinel and other companies involved in marketing the program that the Department does not and cannot endorse any specific product or installers, such as the companies offering the 50/50 program. However, we have also informed them that it was acceptable to indicate that DOE developed the original program concept and had concluded that the program, if correctly implemented, is an effective means of home conservation.

DOE is aware that some home contractors offering the "50/50" program have periodically misrepresented the role of the Department in developing and supporting the implementation of this particular home energy conservation service. We have become aware of these misrepresentations usually as a result of consumers who have directly contacted DOE. Based on the limited number of such direct contacts, we believe that most contractors offering the 50/50 program are not misrepresenting DOE's role. Nevertheless, we are still very concerned whenever an apparent abuse is reported to us and have taken steps to deal with complaints through direct communications with the firms involved.

Question: What is DOE doing to monitor this kind of representation?

Answer: We pursue every complaint or concern that is brought to our attention regarding the marketing of such programs. We do not, however, continually monitor the activity of the companies offering the program. Since legal remedies are available, and there are comparatively few abuses at this time, a costly monitoring activity does not now appear to be warranted.

Question: Do you perceive any danger that the public will become wary of shared energy savings companies just as this industry is getting off the ground because of misrepresentations of DOE involvement and guaranteed energy savings? What else can be done to protect the public and this emerging industry from the adverse effect of such misrepresentations?

Answer: Most companies do not market the 50/50 program as a shared savings service, although this approach has been used in a few cases. Usually, we are told, the program is offered for a flat fee, with an insured guarantee that the homeowner will experience energy cost savings equal to this fee over a 3-5 year period. The guarantee usually offered does require that the homeowner meet certain specified conditions. The companies say that the guarantees are adequately supported by private insurance.

Companies which improperly market shared-savings services or fail to perform adequately such services do of course harm the reputation of the shared-savings industry as a whole. At present the shared-savings concept is likely to continue to be applied largely in commercial, institutional, or industrial settings, as opposed to single-family homes. However, firms that misrepresent the 50/50 program may harm the efforts of other companies trying to serve the energy conservation needs of the residential sector.

The industry can take some steps to protect itself, such as the creation of trade associations which establish reasonable standards of conduct for membership. The National Association of Energy Service Companies is a step in this direction. Other steps are being taken by Federal, state and local agenices charged with enforcing laws against false or misleading advertising. Of course, DOE would cooperate with any such agency if serious questions were raised regarding the marketing of the 50/50 program. Any new industry takes time to establish consumer confidence. The shared-savings industry has made much progress in recent years and we are hopeful that this consumer confidence will be increased in the future.

Question:	Have you worked with the shared energy savings companies to establish voluntary guidelines to avoid such abuses? If not, why not?
Answer:	The staff of the Federal Energy Management Program maintains a close working relationship with the National Association of Energy Service Companies which, as the industry's national trade association, has established an official code of ethics that provides guidance to its members in the conduct of business; FEMP staff has reviewed the NAESCO code of ethics, which is a standard outline of ethical business practices as applied to the energy services industries.

Question: How does DOE currently obtain information about how energy is used in the industrial sector?

Answer: Information on how energy is used in the industrial sector is currently collected by DOE under the Energy Efficiency Improvement Program authorized under EPCA. This program requires that corporations using over a trillion Btu's per year, within any 2-digit Standard Industrial Classification, continue to report to DOE on energy efficiency improvement. Industry reports are due each June and are submitted either directly or through an approved third party sponsor (usually a trade association). Information is assimilated, analyzed, and published annually by DOE. The report on calendar year 1984 efficiency improvement is currently being developed and publication is anticipated by January 1986.

Question: What is the function of the program you operate under Part E of Title III of the Energy Policy and Conservation Act (the "Energy Efficiency Improvement Program")?

Answer: The purpose of this program is to monitor the progress of a select group of industries (by 2-digit Standard Industrial Classification) in improving their energy efficiency. The information that the annual CE-189 survey produces does not, and was never intended to, amount to a comprehensive data base on the consumption of energy in the manufacturing sector.

Question: Doesn't that program make use of a data form known as the CE-189?

Answer: Yes, the CE-189 is the data collection form used to implement the "Energy Efficient Improvement Program" required by Part E, Title III of the Energy Policy and Conservation Act (EPCA).

Question: The program is mandated by Part E of EPCA, isn't it?

Answer: Yes. The CE-189 is an annual data collection mandated by the Energy Policy and Conservation Act as part of a program to promote energy efficiency in American industry.

Question: Is the data you get from the CE-189 useful?

Answer: CE-189 data are useful in that they provide information on the progress of large energy-consuming industries toward improved energy efficiency. However, the utility of the data is limited to providing general information on conservation trends within major industry groups. For instance, within metallurgical industries the survey cannot distinguish between the steel and aluminum industries.

Question: How much does it cost a year to collect the CE-189 data?

Answer: The cost to the Department of collecting the CE-189 data is approximately $300,000 per year. Assuming an estimated burden of about 160,000 man hours of private sector effort, and an estimate of $20.00 an hour labor cost, the estimated cost to industry for responding to CE-189 is about $3.2 million per year.

Question: Isn't the problem that the data reported on CE-189 is provided, pursuant to EPCA, through industry trade associations, which means that DOE cannot specify format, detail and other characteristics of the data that might make it comparable and useful for analytical purposes?

Answer: Yes. The way in which the data are collected does present a problem. However, this is not the only problem which makes the CE-189 data insufficient for statistical analysis. Respondents to the CE-189 include only large corporations consuming at least one trillion Btu per year in a single major industry group, designated by a two-digit Standard Industrial Classification (SIC). This coverage, while it captures much of the energy consumption by the more energy-intensive industries, falls short of complete or representative coverage in other sectors. The EIA has compared consumption estimates from the CE-189 to data (available through 1981) from the "Fuels and Electric Energy Consumed" supplement to the Census Bureau's Annual Survey of Manufactures (ASM). Comparisons of the data from these two surveys at the two-digit SIC level reveal considerable differences that vary from industry to industry and from year to year.

Question: Wouldn't you prefer to see the statute requiring the CE-189 repealed?

Answer: Yes. The Department of Energy and the Office of Management and Budget have agreed that the statutory requirement for the CE-189 program should be repealed.

Question: Hasn't the Administrator of the Energy Information Administration proposed to replace the CE-189 with a new survey known as the Manufacturing Energy Consumption Survey or (MECS)?

Answer: Yes. Attached for the record is a letter from the EIA Administrator, Dr. H. A. Merklein, to the Senate Committee on Energy and Natural Resources and the House of Representatives Committee on Energy and Commerce explaining the advantage of the MECS and the rationale for the elimination of the CE-189. Also attached for the record is a comparison of the two data collection efforts.

Department of Energy
Washington, DC 20585

SEP 1 8 1985

Honorable James A. McClure
Chairman, Committee on Energy
and Natural Resources
United States Senate
Washington, D. C. 20510

Dear Mr. Chairman:

I am writing to advise you of the current status of the Energy Information Administration's (EIA) proposed Manufacturing Energy Consumption Survey (MECS) and to express the Department's concerns regarding the duplication between this survey and the Energy Efficiency Improvement Program (Form CE-189).

To bring you up to date on MECS, we have requested clearance from the Office of Management and Budget (OMB) for a MECS pilot survey. We expect to receive word from OMB on the clearance of the pilot questionnaire by October 25, 1985. If the form is approved, the pilot test would involve no more than 100 respondents. The results of the pilot would help EIA to make any necessary revisions to the data-collection form and instructions. The final MECS form would be submitted for OMB approval by January 1986. The first full-scale MECS would be fielded between April and June of that year and would gather data for calendar year 1985. The Census Bureau would act as EIA's data collection agent for MECS.

The Energy Efficiency Improvement Program, established by Part E of Title III of the Energy Policy and Conservation Act, is an annual survey which collects data on energy consumption from large corporations. Both industry and government recognize that consumption data similar to those that will be produced from the MECS are being collected by the Energy Efficiency Improvement Program on Form CE-189. As we have discussed with Committee staff, manufacturers have expressed considerable concern with respect to the duplication between these two data collection surveys. Less well known and little understood, however, is that, because of the way the two surveys are designed, the MECS is better able to achieve the goal of providing data that are usable for analyzing the consumption of energy in manufacturing.

Respondents to the CE-189 include only large corporations consuming one trillion Btu per year or more in a single major industry group, designated by a two-digit Standard Industrial

Classification (SIC). This coverage, while it captures much of the energy consumption by the more energy-intensive industries, falls short of complete or representative coverage in other sectors. The EIA has compared consumption estimates from the CE-189 to data (available through 1981) from the "Fuels and Electric Energy Consumed" supplement to the Census Bureau's Annual Survey of Manufactures (ASM). Comparisons of the data from these two surveys at the two-digit SIC level reveal considerable differences that vary from industry to industry and from year to year. Therefore, the information that the CE-189 survey yields is not (and was never intended to be) a comprehensive data base on the consumption of energy in the manufacturing sector. In addition, the way the CE-189 data are collected precludes any geographic breakdown of the information, (e.g., by region of the country), and makes it impossible to measure consumption in important subsectors of industry, such as differentiating between the energy-intensive industries of steel and aluminum.

In contrast to the CE-189, the MECS would obtain statistically reliable information from a sample of all manufacturing establishments on a triennial basis. This information could be disaggregated geographically and by major energy-consuming subsectors. In addition, the average annual burden of MECS is expected to be less than CE-189.

As well as supporting statistically reliable publications, MECS could be used to produce measures of energy efficiency that would serve the same purposes as those now presented in the "Annual Report to the Congress and the President on Industrial Energy Efficiency Improvement 1983". Such measures would be based on energy consumption data collected by MECS and economic data collected by the ASM on value of shipments or value added. For the years in which the MECS is not fielded, ASM data on total fuels consumed and value added or value of shipments (in constant dollars) could be apportioned to various SIC's, based on the most recent MECS data, to estimate these measures.

In view of the advantages of MECS and the shortcomings of the CE-189, and in the interest of reducing the reporting burden on industry, the Department of Energy proposes that CE-189 be eliminated. Regardless of whether or not OMB approves MECS, we have been informed by OMB that there is no objection to eliminating CE-189 from the point of view of the Administration's program.

At this point, the best legislative route for accomplishing the elimination of the CE-189 program is unclear. I would be happy to work with you to develop the legislative language and to identify the appropriate vehicle for eliminating this requirement. David Montgomery of my staff will be in contact with Committee staff to assist in resolving the issues associated with the proposed elimination of the CE-189 program.

Sincerely,

H.A. Merklein

Dr. H. A. Merklein
Administrator
Energy Information Administration

cc: Honorable J. Bennett Johnston
Rankirg Minority Member

Honorable James A. McClure
Chairman, Subcommittee on Interior
and Related Agencies
Committee on Appropriations

Honorable Robert C. Byrd
Ranking Minority Member
Subcommittee on Interior
and Related Agencies
Committee on Appropriations

October 22, 1985

Comparison Between

The Proposed Manufacturing Energy Consumption Survey, Form EIA-846
and
The Energy Efficiency Improvement Program, Form CE-189

	EIA-846(MECS)	CE-189
1. Target population	All manufacturing establishments in the U.S. with 5 or more employees (approximately 225,000).	All manufacturing corporations which consume at least one trillion BTU of energy per year in any 2-digit SIC (about 700 corporations representing approximately 15,000 establishments.)
2. Method of data collection	National probability sample of 12,000 establishments.	Census of eligible corporations as defined in (1) above.
3. Unit of collection	Manufacturing establishment at a single physical location.	Any establishment with production in an eligible 2-digit SIC category as defined in (1) above.
4. Fuel consumption data	Total by energy source for entire establishment.	Total by energy source only for eligible 2-digit SICs within establishment as defined in (1) above.
5. Energy throughput data collected	Data on purchased energy sources, on-site production of energy sources, fuel consumption, and feedstock consumption	Fuel consumption data.
6. Expenditures data	Yes	No
7. Fuel-switching data	Yes	No
8. Storage capacity data	Yes	No

Comparison Between Form EIA-846 and CE-189

9. Byproduct fuel data	Yes, identified separately.	Yes, but combined with all other consumption of that energy source.
10. On-site electricity generation and cogeneration data	Yes	No
11. Feedstock data	Total by feedstock-type for entire establishment.	No feedstock data collected.
12. Waste materials fuel data	Total by type of waste material for entire establishment.	No waste material fuels data collected.
13. National two-digit SIC consumption	Yes	Yes, but coverage more complete for some 2-digit SICs than for others. (Ranges from 20 percent to 90+ percent coverage)
14. Regional estimates available	Yes	No. Data are aggregated by corporation and then by trade associations to national 2-digit SIC totals.
15. Detailed industry (3- and 4-digit SIC) consumption data available	Yes, but limited to those which are the most energy-intensive.	No. See (14) above.
16. Conservation indices available	Yes, using energy consumption per deflated dollar of value of shipments, with historical data from the Annual Survey of Manufactures (ASM) for comparison.	Yes, using energy consumption from current year and historic consumption per unit of production.
17. Frequency of collection	Triennial	Annual
18. Estimated burden	48,000 hours, annual average	157,628 per year
19. Economic data	Yes, through linking with Bureau of Census ASM.	No

Question: What are the advantages of MECS as compared to the CE-189 program?

Answer: The information that the CE-189 survey produces does not (and was never intended to) amount to a comprehensive data base on the consumption of energy in the manufacturing sector. The MECS is being designed to produce such a statistically-reliable, comprehensive data set. Certain key data elements included on the MECS are unavailable from the CE-189. These include energy expenditures, storage capacity, fuel switching capability, consumption of energy as a feedstock, and on-site electricity generation and cogeneration data.

In addition, the way the CE-189 data are collected precludes any geographic breakdown of the information, (e.g., by region of the country), and makes it impossible to measure consumption in important subsectors of manufacturing, such as differentiating between the energy-intensive industries of steel and aluminum.

In contrast to the CE-189, the MECS would obtain statistically reliable information from a sample of all manufacturing establishments on a triennial basis. This information could be disaggregated geographically and by major energy-consuming subsectors.

Question: Isn't the reporting burden of MECS less than the burden of CE-189?

Answer: Yes. The MECS will be conducted triennially and the average annual reporting burden is expected to be about 48,000 hours. In contrast, the estimated annual reporting burden of the CE-189 is 157,628 hours.

Question: Isn't the Federal cost of MECS less than the cost of the CE-189 program?

Answer: The average annual cost for MECS is expected to be about $360,000 as compared with approximately $300,000 a year for the CE-189 program. The MECS cost estimate includes all costs associated with data collection and processing and with EIA's resultant publications and analyses. While the estimated average annual cost of the MECS is somewhat higher than the annual cost of the CE-189 program, the information obtained via the MECS and the MECS publications and analyses are expected to be more comprehensive and more useful than those currently available using CE-189 data. In addition, the costs to the private sector of responding to the MECS survey are expected to be significantly lower.

Question:	Are there differences in how data would be handled from the point of view of confidentiality under MECS as opposed to CE-189?
Answer:	There will be differences in how the data are collected in that MECS data will be collected at the establishment level whereas CE-189 data are gathered at the corporation level. However, from the standpoint of confidentiality, access to individually identifiable information from the MECS will be more restricted than access to CE-189 data. The statute requiring the CE-189 program allows the Secretary of Energy to obtain individual plant reports which comprise the corporate energy information. This will not be possible with MECS. EIA has entered into an interagency agreement with the Bureau of the Census to use the Bureau as its agent to conduct the MECS. The Census Bureau will collect these data pursuant to the authority provided in title 13, United States Code. Since section 9 of title 13 prohibits dissemination of individually identifiable data collected under this authority to persons outside the Bureau, the concerns of manufacturers about the confidentiality of these data should be allayed. Thus MECS data will have the same confidentiality protection afforded to all the other data collections which are conducted by the Bureau under the title 13 authority, such as the Annual Survey of Manufactures and the quinquennial Census of Manufactures.

Question: Wouldn't the MECS provide data on expenditures, fuel switching capability, inventories, cogeneration, use of waste materials, and feedstock consumption that is not available from CE-189?

Answer: The MECS would provide several key data elements which are unavailable from the CE-189. These include energy expenditures, storage capacity, fuel switching capability, production of byproduct energy sources, consumption of energy as a feedstock, and on-site electricity generation and cogeneration data. Inventory data will not be collected on the MECS.

Question: Does DOE need any new authority to carry out the proposed MECS?

Answer: No. Sufficient legislative authority exists in Section 52 of the Federal Energy Administration Act of 1974 (Public Law 93-275) and the DOE Organization Act (Public Law 95-91) which mandate EIA's baseline energy information program.

Question: If Part E of title III of EPCA is repealed, so that the CE-189 is no longer required, what assurance is there that the Department will go forward with MECS?

Answer: The EIA has been directed by the Congress to conduct the MECS. This direction was set forth in the report accompanying the FY 1985 appropriation for EIA. The Department of Energy, as a general rule makes every effort to comply with such expressions of Congressional intent.

As EIA proceeds with the implementation of the MECS, the issue of duplication with the CE-189 program must be resolved. The Department of Energy and the Office of Management and Budget (OMB) are agreed that legislative action should be taken to eliminate the statutory requirement for the CE-189 program. Absent this elimination, the MECS will continue to be criticized as duplicative of the existing CE-189 data collection.

Question:	**Should all of Part E of title III of EPCA be repealed or just some of it? Are there important features of the Energy Efficiency Improvement Program - such as targets or reports to Congress and the public - that we should retain?**
Answer:	All of Part E of title III of EPCA should be repealed. However, this is not to say that energy efficiency ratios similar to those calculated from the CE-189 data would be unavailable. In addition to producing statistically-reliable energy data publications, MECS data could be used to produce measures of energy efficiency that would serve the same purpose as those now presented in the "Annual Report to the Congress and the President on Industrial Energy Efficiency Improvement 1983". Such measures would be based on energy consumption data collected by MECS and economic data collected by the ASM on value of shipments or value added. For the years in which the MECS is not fielded, ASM data on total fuels consumed and value added or value of shipments (in constant dollars) could be apportioned to various SIC's based on the most recent MECS data, to estimate these measures.

Question: What is the current status of the proposed MECS program?

Answer: The EIA has received clearance from OMB for a pilot test of the MECS. The pilot will be fielded in November 1985 and will involve no more than 100 respondents. The purpose of the pilot survey is to test the data collection questionnaire and its accompanying instructions before fielding the first full-scale survey. It should be possible to field the first full-scale MECS in the Spring of 1986 to gather information for calendar year 1985 from approximately 12,000 manufacturing establishments.

Question: What is the current status of the Energy Efficiency Improvement Program authorized under EPCA?

Answer: Corporations using over a trillion Btu's per year, within any 2-digit Standard Industrial Classification, continue to report to DOE on energy efficiency improvement. Industry reports are due each June and are submitted either directly or through an approved third party sponsor. Information is assimilated, analyzed, and published annually by DOE. The report on calendar year 1984 efficiency improvement is currently being developed and publication is anticipated by January 1986. Required information on recovered materials utilization is also published each year for four industries.

The Department of Energy's present position is that continuation of the industrial energy efficiency reporting program is not necessary, as the cost of administering it outweighs the energy conservation benefits. In addition, large corporations have considerable economic self interest in continuing to monitor their own energy consumption without the requirement of federal reporting. In a September 18 letter to Senator McClure, Dr. Merklein of EIA proposed working with the staff of the Energy & Natural Resources Committee to develop legislation to repeal this reporting program. Until such legislation is enacted, however, the Department will continue its administration.

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